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APPENDIX IV.

TO THE

FINAL REPORT

OF THE

G.B.

ROYAL COMMISSION ON VACCINATION.

REPORTS TO THE COMMISSION OF

DR. ARTHUR PEARSON LUFF

ON OUTBREAKS OF SMALL-POX IN LONDON IN 1892-3.

Presented to both Houses of Parliament by Command of Her Majesty.

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APPENDIX IV.

A.—Report of Dr. Arthur Pearson Luff on the Outbreak of Small-pox in London in 1892.

I beg to present my report of the outbreak of small-pox that occurred in London in 1892, with the various statistics that I have obtained as to the influence of vaccination on the number of cases attacked, the nature of the cases and the mortality, as well as the influence of the character and area of the vaccination marks on the disease. The outbreak commenced at the beginning of 1892, and practically concluded at the end of August of the same year. The cases notified as small-pox in London during this period were 352 in number. Of these the actual number of cases that proved to be small-pox were 292, the remaining 60 cases being in the majority of cases varicella.

The origin of the outbreak at the beginning of January 1892 was probably due to a case of small-pox imported into St. Pancras from Switzerland by a Swiss waiter, and from a Swiss waiters' club (the Helvetia Club, 107, Charlotte Street, Fitzroy Square), the disease spread to some of the members and servants of the club and through a member of the club to the French Hospital in Shaftesbury Avenue, from which source several cases were infected. In the latter part of February 1892 an outbreak of small-pox occurred in Shoreditch. The first case notified in Shoreditch was on February 29th, and was that of a boy resident in New Inn Street, who was probably infected by a girl taken ill about February 7th. Her case was not notified, and was supposed at the time to be a case of chicken-pox. A woman in the same house as this girl developed a mild attack of a similar disease about February 20th. The girl was probably infected by some person coming to her father's workshop, which was attached to the house, the person probably coming from an infected locality in search of work. About 90 cases in all were traceable to the case in New Inn Street. According to the report of Dr. Allan, at that time the Medical Officer of Health for Shoreditch, the 90 cases were distributed among 63 families residing in 47 houses, each containing two or more families, one of them being a crowded tenement house with 20 families

33 houses had 1 case each.
9 houses had 2 cases each.
1 house had 3 cases.
1 house had 5 cases.
2 houses had 6 cases each.
1 tenement house had 19 cases.

In all but three instances only one house in the street was infected. These three were—New Inn Street with 10 houses; Drysdale and Essex Streets with 2 each. In Rodney Buildings, where a large number of families lived, a great number of cases occurred, as will be seen by reference to the Forms "A." and "B." which I forward to the Commission with this report.* A number of cases were also probably infected through dirty linen from the French Hospital.

Owing to my not being appointed to inquire into the outbreak until June 18th, 1892, when the outbreak was subsiding, it was difficult to obtain full particulars of many of the cases, and in a few of the cases all inquiries proved futile. On the forms marked "A" will be found the particulars which show that the source of infection has been traced in the majority of cases, and fuller particulars of the individual cases will be found on the forms marked "B." After my being appointed to inquire into the outbreak on June 18th, I visited the fresh cases, and saw as many of them as I could gain access to. With regard to the cases notified previous to June 18th, I was able to see some of them at the hospital ships at Long Reach, Dartford, and some of them at their homes; and the particulars as to vaccination, nature and area of the vaccination marks, re-vaccination, &c. so obtained, have been supplemented by data kindly furnished me by Dr. Birdwood, the medical superintendent of the hospital ships at that time, by the Metropolitan Asylums Board, and by the Medical Officers of Health of the different districts, to all of whom I am indebted for much valuable information that has been at all times most courteously given. With regard to many of the cases that were treated at their homes, it was difficult to obtain much information, partly on account of the time that had elapsed and partly on account of the unwillingness of the friends to respond to the inquiries that were made. Of the 292 cases of small-pox that occurred, I have obtained the following particulars:—

Whether vaccinated, re-vaccinated or un-vaccinated, information was obtained in 279 cases.

No further information obtained beyond the fact of small-pox having been caught in 13 cases, mainly owing to the people having removed and my not being able to trace them; but from inquiries that I made, no instance of death occurring in these 13 cases was heard of.

Of the 279 cases, I ascertained that 63 cases (22·5 per cent. of the whole) occurred in children under 10 years of age.

Of the 279 cases that I was able to investigate, 39 were unvaccinated; and in 26 other cases, the vaccination was doubtful by reason of the absence of marks from the arms, no scars being visible. Deducting these 65 cases from the 279 cases attacked, 214 are left, representing those who had undoubtedly been vaccinated, and of these the following particulars were obtained:—

Information as to whether re-vaccinated or not was obtained in all cases.

Information as to the number of vaccination scars was obtained in 197 cases.

Information as to foveation or not of the scars was obtained in 197 cases.

Information as to the area of the vaccination scars was obtained in 135 cases.

The meanings attached to the terms "vaccinated class," "revaccinated class," and "unvaccinated class" in this report are those given in Dr. Barry's report on the Sheffield small-pox epidemic of 1887–1888.

"*Vaccinated class*" includes all persons successfully vaccinated at any period exceeding 13 days prior to the appearance on them of the eruption of small-pox.

"*Unvaccinated class*" includes all persons who have either never been successfully vaccinated or whose vaccination was performed for the first time within 13 days of the appearance on them of the eruption of small-pox.

"*Re-vaccinated class*," includes all persons successfully re-vaccinated at any period exceeding 13 days prior to the appearance on them of the eruption of small-pox.

Table I. gives—

(1.) The number of attacks at different age-periods.
(2.) The number of deaths that occurred.
(3.) The nature of attack and the number of deaths occurring with each variety of small-pox.
(4.) The influence of the number, and foveation of the vaccination scars, and of the area of the vaccination scars on (*a*) the nature of the attack, (*b*) the mortality.
(5.) The influence of re-vaccination on (*a*) the nature of the attack, (*b*) the mortality.
(6.) The number of those who were known to have been vaccinated, but in connection with whom the number and nature of the scars could not be ascertained.
(7.) The number of doubtful cases of vaccination, with the number of deaths and the nature of the attack.
(8.) The number of unvaccinated cases, with the number of deaths and the nature of the attack.

In all these groups special columns show the number of deaths that occurred in connection with each variety of small-pox.

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* *Not here reproduced.*

TABLE I.

Age Period.	All Cases.							Vaccinated																								
								Nature of Attack in reference to Number																								
	No.	Deaths.	Nature of Attack.					One Scar.										Two Scars.										Three				
								Foveated.					Unfoveated.					Foveated.					Unfoveated.					Foveated.				
								Nature of Attack.					Nature of Attack.					Nature of Attack.					Nature of Attack.					Nature of Attack.				
			Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.	Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.	Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.	Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.	Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.	Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.
Under 1 year.	8	3	4				0	0				0	0				0	0				0	0				0	1				0
				0			0		0			0		0			0		0			0		0			0		0			0
					4		3			0		0			0		0			0		0			0		0			0		0
						0	0				0	0				0	0				0	0				0	0				0	0
1 to 5 years.	20	8	7				0	0				0	0				0	0				0	0				0	0				0
				4			0		0			0		0			0		0			0		0			0		0			0
					8		7			0		0			0		0			0		0			0		0			0		0
						1	1				0	0				0	0				0	0				0	0				0	0
5 to 10 years.	35	2	15				0	0				0	0				0	1				0	0				0	4				0
				16			0		0			0		3			0		1			0		0			0		1			0
					3		1			0		0			0		0			0		0			0		0			0		0
						1	1				0	0				0	0				0	0				0	0				0	0
10 to 15 years.	41	0	16				0	0				0	2				0	1				0	0				0	4				0
				19			0		0			0		1			0		1			0		0			0		4			0
					6		0			1		0			1		0			0		0			0		0			0		0
						0	0				0	0				0	0				0	0				0	0				0	0
15 to 20 years.	58	2	18				0	0				0	0				0	2				0	0				0	3				0
				32			0		2			0		0			0		1			0		6			0		6			0
					7		1			0		0			0		0			0		0			1		0			0		0
						1	1				0	0				0	0				0	0				0	0				0	0
20 to 30 years.	67	3	9				0	0				0	1				0	0				0	0				0	3				0
				45			0		4			0		0			0		5			0		2			0		9			0
					10		0			0		0			1		0			0		0			1		0			1		0
						3	3				0	0				0	0				0	0				1	1				0	0
30 to 40 years.	29	4	4				0	1				0	0				0	0				0	0				0	0				0
				13			0		1			0		1			0		1			0		2			0		1			0
					12		4			0		0			0		0			0		0			1		0			1		0
						0	0				0	0				0	0				0	0				0	0				0	0
40 years and over.	21	3	4				0	0				0	0				0	1				0	0				0	0				0
				13			0		2			0		2			0		1			0		1			0		1			0
					4		3			0		0			1		1			0		0			0		0			0		0
						0	0				0	0				0	0				0	0				0	0				0	0
Totals	279	25	77				0	1				0	3				0	5				0	0				0	15				0
				142			0		9			0		7			0		10			0		11			0		22			0
					54		19			1		0			3		1			0		0			3		0			2		0
						6	6				0	0				0	0				0	0				1	1				0	0

TABLE I.

Cases.																																		
and Character of Scars.															Nature of Attack in reference to Area of Scars.															Number of Scars unknown.				
Scars.					Four or more Scars.										Area under ¼ sq. Inch.					Area from ¼ to ½ sq. Inch.					Area over ½ sq. Inch.									
Unfoveated.					Foveated.					Unfoveated.																								
Nature of Attack.					Nature of Attack.					Nature of Attack.					Nature of Attack.					Nature of Attack.					Nature of Attack.					Nature of Attack.				
Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.	Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.	Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.	Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.	Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.	Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.	Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.
0	0	0	0	0 0 0 0	1	0	0	0	0 0 0 0	2	0	0	0	0 0 0 0	0	0	0	0	0 0 0 0	0	0	0	0	0 0 0 0	1	0	0	0	0 0 0 0	0	0	0	0	0 0 0 0
2	0	0	0	0 0 0 0	3	0	0	0	0 0 0 0	2	0	0	0	0 0 0 0	0	0	0	0	0 0 0 0	2	0	0	0	0 0 0 0	3	0	0	0	0 0 0 0	0	1	0	0	0 0 0 0
0	3	0	0	0 0 0 0	2	1	0	0	0 0 0 0	3	1	0	0	0 0 0 0	0	1	0	0	0 0 0 0	3	3	0	0	0 0 0 0	2	2	0	0	0 0 0 0	5	2	0	0	0 0 0 0
2	2	0	0	0 0 0 0	3	2	0	0	0 0 0 0	3	5	0	0	0 0 0 0	2	2	1	0	0 0 0 0	1	6	1	0	0 0 0 0	6	4	0	0	0 0 0 0	1	1	0	0	0 0 0 0
0	2	0	0	0 0 0 0	4	6	1	0	0 0 0 0	7	3	0	0	0 0 0 0	0	4	0	0	0 0 0 0	3	6	0	0	0 0 0 0	8	10	1	0	0 0 0 0	0	2	0	0	0 0 0 0
1	2	1	0	0 0 0 0	3	7	1	0	0 0 0 0	1	6	1	0	0 0 0 0	0	5	2	0	0 0 0 0	0	12	0	0	0 0 0 0	7	11	2	0	0 0 0 0	0	4	0	0	0 0 0 0
1	1	1	0	0 0 0 0	0	1	2	0	0 0 0 0	2	4	1	0	0 0 0 0	1	2	1	0	0 0 0 0	1	4	1	0	0 0 0 0	1	1	2	0	0 0 0 0	0	0	0	0	0 0 0 0
2	1	0	0	0 0 0 0	0	0	0	0	0 0 0 0	1	3	1	0	0 0 1 0	0	2	1	0	0 0 1 0	0	3	1	0	0 0 1 0	1	2	0		0 0 0 0	0	1	0	0	0 0 0 0
8	11	2	0	0 0 0 0	16	17	4	0	0 0 0 0	21	22	3	0	0 0 1 0	3	16	5	0	0 0 1 0	10	34	3	0	0 0 1 0	29	30	5	0	0 0 0 0	6	11	0	0	0 0 0 0

TABLE I.—*continued.*

Age Period.	RE-VACCINATED													
	Re-vaccinated Once.							Re-vaccinated Twice.						
	No.	Deaths.	Nature of Attack.					No.	Deaths.	Nature of Attack.				
			Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.			Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.
Under 1 year - -	0	0	0	0	0	0	0 0 0 0	0	0	0	0	0	0	0 0 0 0
1 to 5 years - - -	0	0	0	0	0	0	0 0 0 0	0	0	0	0	0	0	0 0 0 0
5 to 10 years - -	0	0	0	0	0	0	0 0 0 0	0	0	0	0	0	0	0 0 0 0
10 to 15 years - -	1	0	1	0	0	0	0 0 0 0	0	0	0	0	0	0	0 0 0 0
15 to 20 years - -	1	0	1	0	0	0	0 0 0 0	0	0	0	0	0	0	0 0 0 0
20 to 30 years - -	2	0	2	0	0	0	0 0 0 0	0	0	0	0	0	0	0 0 0 0
30 to 40 years - -	3	0	1	1	1	0	0 0 0 0	0	0	0	0	0	0	0 0 0 0
40 years and upwards -	2	1	0	1	1	0	0 0 1 0	2	0	2	0	0	0	0 0 0 0
Totals - - -	9	1	5	2	2	0	0 0 1 0	2	0	2	0	0	0	0 0 0 0

TABLE I.—*continued.*

Cases.							Vaccination doubtful. No Scars visible.							Unvaccinated Cases.						
Re-vaccinated Three Times.																				
No.	Deaths.	Nature of Attack.					No.	Deaths.	Nature of Attack.					No.	Deaths.	Nature of Attack.				
		Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.			Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.			Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Deaths.
0	0	0	0	0	0	0 0 0 0	0	0	0	0	0	0	0 0 0 0	4	3	0	0	4	0	0 0 3 0
0	0	0	0	0	0	0 0 0 0	1	0	0	0	1	0	0 0 0 0	11	8	0	3	7	1	0 0 7 1
0	0	0	0	0	0	0 0 0 0	0	0	0	0	0	0	0 0 0 0	8	2	0	4	3	1	0 0 1 1
0	0	0	0	0	0	0 0 0 0	1	0	0	1	0	0	0 0 0 0	6	0	0	2	4	0	0 0 0 0
0	0	0	0	0	0	0 0 0 0	8	2	1	4	2	1	0 0 1 1	4	0	0	1	3	0	0 0 0 0
0	0	0	0	0	0	0 0 0 0	6	1	0	5	0	1	0 0 0 1	6	1	0	1	4	1	0 0 0 1
0	0	0	0	0	0	0 0 0 0	7	4	0	1	6	0	0 0 4 0	0	0	0	0	0	0	0 0 0 0
0	0	0	0	0	0	0 0 0 0	3	1	0	1	2	0	0 0 1 0	0	0	0	0	0	0	0 0 0 0
0	0	0	0	0	0	0 0 0 0	26	8	1	12	11	2	0 0 6 2	39	14	0	11	25	3	0 0 11 3

Of the 39 cases occurring among unvaccinated persons, 14 proved fatal. Of the 26 cases occurring among persons whose vaccination was doubtful, eight proved fatal. Of the 214 cases occurring among vaccinated persons, three proved fatal.

These figures converted to per-centages give the following results :—

TABLE II.

Fatality as a Per-centage among the Vaccinated and Unvaccinated.

Per-centage of Deaths among the Vaccinated.	Per-centage of Deaths among those whose Vaccination was doubtful.	Per-centage of Deaths among the Unvaccinated.
1·4	30·7	35·9

A comparison of the fatality as a per-centage among the total sufferers, the vaccinated, those whose vaccination was doubtful, and the unvaccinated gives the following results :—

TABLE III.

——	No.	Deaths.	Per-centage of Deaths.
Total sufferers -	279	25	8·9
Vaccinated cases -	214	3	1·4
Doubtful cases -	26	8	30·7
Unvaccinated cases -	39	14	35·9

so that the mortality among the unvaccinated was 25 times that of the vaccinated cases.

Had the unvaccinated cases died at the rate of the vaccinated class, in place of the 14 deaths there would have been 0·5 death. Had the vaccinated cases died at the rate of the unvaccinated class, in place of the three deaths there would have been 76 deaths.*

With regard to the mortality at different ages among the vaccinated and unvaccinated cases (all reference to "doubtful" cases being here and henceforth omitted), the following summary is obtained :—

TABLE IV.

Age Incidence of Attack and Death from Small-pox among the Vaccinated and Unvaccinated, with Per-centages of Deaths to Attacks at different Ages.

Age Periods.	Vaccinated.			Unvaccinated.		
	Cases.	Deaths.	Per-centage of Deaths.	Cases.	Deaths.	Per-centage of Deaths.
0 to 1 year - -	4	0	0·0	4	3	75·0
1 to 5 years -	8	0	0·0	11	8	72·7
5 to 10 years -	27	0	0·0	8	2	25·0
10 to 15 years -	34	0	0·0	6	0	0·0
15 to 20 years -	46	0	0·0	4	0	0·0
20 to 30 years -	55	1	1·8	6	1	16·6
30 to 40 years -	22	0	0·0	0	0	0·0
40 years and over -	18	2	11·1	0	0	0·0
Totals -	214	3	1·4	39	14	35·9

From this table it is seen that under 10 years of age no deaths occurred among the vaccinated, whereas among the unvaccinated under 10 years of age who caught small-pox, 56·5 per cent. of deaths occurred. Over 10 years of age the percentage of deaths among the vaccinated was 1·7, and among the unvaccinated, 6·2. The table also shows that vaccination gave absolute protection against death to the age of 20 years, whereas among the unvaccinated cases up to 20 years of age the fatality was 39 per cent.

Proceeding now to the consideration of the facts as to the nature or severity of the attack among the vaccinated and unvaccinated, the following are the results :—

TABLE V.

Nature of Attack.	Vaccinated.	Unvaccinated.
Very mild - - -	76	0
Discrete - - -	119	11
Confluent - - -	18	25
Hæmorrhagic - -	1	3
Totals - -	214	39

This table shows that 18 vaccinated persons out of 214 (8 per cent.) had confluent small-pox, whereas 25 unvaccinated persons out of 39 (64 per cent.) had confluent small-pox. Putting the confluent and hæmorrhagic cases together it is seen that 8·8 per cent. of the vaccinated had bad attacks, whilst 71·8 per cent. of the unvaccinated had bad attacks. The chances of a bad attack among the unvaccinated as compared with the vaccinated being 8 to 1. Moreover, out of the 18 cases of confluent small-pox occurring in vaccinated persons, only two deaths occurred ; whereas out of the 25 cases of confluent small-pox occurring in unvaccinated persons 11 deaths occurred. The single case of hæmorrhagic small-pox in a vaccinated person occurred in an individual between 20 and 30 years of age, who had been vaccinated in infancy only, and had two unfoveated scars.

If now the figures are taken as to the nature or severity of attack among the vaccinated and unvaccinated under 10 years of age, the following results are obtained :—

TABLE VI.

Cases under 10 Years of Age.

Nature of Attack.	Vaccinated.	Unvaccinated.
Very mild - - -	26	0
Discrete - - -	13	7
Confluent - - -	0	14
Hæmorrhagic - -	0	2

Under 10 years of age none of the vaccinated had bad attacks, whereas 69·5 per cent. of the unvaccinated had bad attacks.

With regard to the facts obtained as to the nature or severity of the attack and the per-centages of deaths among the vaccinated, re-vaccinated, and unvaccinated classes, the results are arranged in Table VII.

TABLE VII.

—	No. of Cases.	Nature of Attack.		No. of Deaths.	Per-centage of Deaths.
		Mild.	Severe.		
Vaccinated once -	203	186	17	2	0·9
Re-vaccinated -	11	9	2	1	9·0
Unvaccinated - -	39	11	28	14	35·9

---

* Had the cases of doubtful vaccination died at the rate of the vaccinated class, in place of the eight deaths there would have been 0·3 death ; had they died at the rate of the unvaccinated class, in place of the eight deaths there would have been nine deaths.

As regards the age incidence of the vaccinated persons attacked, the following are the particulars:—

TABLE VIII.

Age Incidence of Vaccinated Persons attacked.	
Under 10 Years.	Over 10 Years.
39	175

With regard to the re-vaccinated cases out of the 214 vaccinated cases, 11 had been re-vaccinated, and of these 11 re-vaccinated cases, nine had been re-vaccinated once, and two had been re-vaccinated twice. No person re-vaccinated a third time was attacked with small-pox.

With regard to the facts as to the nature of attack and mortality among the vaccinated, the 214 cases resolve themselves thus:—

TABLE IX.

VACCINATED CASES.

Nature of Attack.	No.	Deaths.
Very mild - - -	76	0
Discrete - - -	119	0
Confluent - - -	18	2
Hæmorrhagic - -	1	1

Setting out the facts in tabular fashion as to the nature of attack at different ages among the vaccinated, the following table is obtained:—

TABLE X.

Age Period.	Nature of Attack.				Per-centage of Cases.			
	Very mild.	Discrete.	Confluent.	Hæmorrhagic.	Very mild.	Discrete.	Confluent.	Hæmorrhagic.
0 to 1 year - -	4	0	0	0	100·0	0·0	0·0	0·0
1 to 5 years - -	7	1	0	0	87·5	12·5	0·0	0·0
5 to 10 years -	15	12	0	0	55·5	44·5	0·0	0·0
10 to 15 years -	16	16	2	0	47·0	47·0	6·0	0·0
15 to 20 years -	17	27	2	0	36·9	58·7	4·4	0·0
20 to 30 years -	9	39	6	1	16·3	70·9	11·0	1·8
30 to 40 years -	4	12	6	0	18·2	54·5	27·3	0·0
40 years and over -	4	12	2	0	22·2	66·7	11·1	0·0

From this table it is seen that up to 10 years of age small-pox in vaccinated persons was of a mild nature and that from 10 to 20 years of age it only appeared in a severe form among the vaccinated in a small proportion of the cases; whereas after 20 years of age the proportion of the severe cases is much greater.

The data obtained showing the relation existing between the number of vaccination scars and the nature of attack give when tabulated the following results:—

TABLE XI.

Age Periods.	One Scar.		Two Scars.		Three Scars.		Four Scars.	
	Discrete.	Confluent.	Discrete.	Confluent.	Discrete.	Confluent.	Discrete.	Confluent.
0 to 1 year - -	0	0	0	0	1	0	3	0
1 to 5 years -	0	0	0	0	2	0	5	0
5 to 10 years -	3	0	2	0	8	0	7	0
10 to 15 years -	3	2	2	0	12	0	13	0
15 to 20 years -	2	0	9	1	11	0	20	1
20 to 30 years -	5	1	7	2	15	2	17	2
30 to 40 years -	3	0	3	1	3	2	7	3
40 years and over -	4	1	3	0	4	0	4	1
Totals - -	20	4	26	4	56	4	76	7

From this table the following relative particulars of discrete and confluent attacks as compared with the number of vaccination scars can be deduced.

For all Ages.

1 *scar.*—5 cases of discrete to 1 case of confluent.
2 *scars.*—6·5 ,, ,, 1 ,, ,,
3 *scars.*—14 ,, ,, 1 ,, ,,
4 *scars.*—11 ,, ,, 1 ,, ,,

Under 20 *Years of Age.*

1 *scar.*—4 cases of discrete to 1 case of confluent.
2 *scars.*—13 ,, ,, 1 ,, ,,
3 *scars.*—34 ,, ,, 0 ,, ,,
4 *scars.*—48 ,, ,, 1 ,, ,,

These results fairly bear out the conclusion that the greater the number of vaccination scars, the less severe is the nature of the attack.

Taking next into consideration the influence of foveated and unfoveated scars upon the nature of attack, the following are the results obtained:—

TABLE XII.

Age Periods.	One Scar.				Two Scars.				Three Scars.				Four Scars.			
	Foveated.		Unfoveated.		Foveated.		Unfoveated.		Foveated.		Unfoveated.		Foveated.		Unfoveated.	
	Discrete.	Confluent.	Discrete.	Confluent.	Discrete.	Confluent.	Discrete.	Confluent.	Discrete.	Confluent.	Discrete.	Confluent.	Discrete.	Confluent.	Discrete.	Confluent.
0 to 1 year - - -	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	0
1 to 5 years - - -	0	0	0	0	0	0	0	0	0	0	2	0	3	0	2	0
5 to 10 years - -	0	0	3	0	2	0	0	0	5	0	3	0	3	0	4	0
10 to 15 years - -	0	1	3	1	2	0	0	0	8	0	4	0	5	0	8	0
15 to 20 years - -	2	0	0	0	3	0	6	1	9	0	2	0	10	1	10	0
20 to 30 years - -	4	0	1	1	5	0	2	2	12	1	3	1	10	1	7	1
30 to 40 years - -	2	0	1	0	1	0	2	1	1	1	2	1	1	2	6	1
40 years and over - -	2	0	2	1	2	0	1	0	1	0	3	0	0	0	4	1
Total cases - -	10	1	10	3	15	0	11	4	37	2	19	2	33	4	43	3

Reducing these to per-centages of confluent attacks among those of all ages having foveated or unfoveated vaccination scars, the results are as follows:—

TABLE XIII.

All Ages.

—	One Scar.		Two Scars.		Three Scars.		Four Scars.	
	Foveated.	Unfoveated.	Foveated.	Unfoveated.	Foveated.	Unfoveated.	Foveated.	Unfoveated.
Per-centages of confluent attacks.	9	23	0	26	5	9	10	7

With the exception of the per-centages obtained in connexion with the cases of four scars, more confluent attacks occur in those having unfoveated scars than in those having foveated. This becomes more apparent if the figures are lumped together under each of the subheadings, when the following results are obtained:—

TABLE XIV.

No. of Scars.	Foveated.		Unfoveated.	
	Discrete.	Confluent.	Discrete.	Confluent.
One scar - -	10	1	10	3
Two scars - -	15	0	11	4
Three scars - -	37	2	19	2
Four scars - -	33	4	43	3
Total cases -	95	7	83	12
Per-centages -	93·2	6·8	87·4	12·6

This table shows that 6·8 per cent. of confluent attacks occurred amongst those having foveated scars, whereas 12·6 per cent. of confluent attacks occurred among those having unfoveated scars, showing that the proportion of cases of confluent small-pox occurred in the latter class was nearly double that of the former.

By looking to the death-rates the results bear out a similar conclusion.

TABLE XV.

—	Foveated.			Unfoveated.		
	Cases.	Deaths.	Mortality Per Cent.	Cases.	Deaths.	Mortality Per Cent.
One scar - -	11	0	0·0	13	1	7·7
Two scars - -	15	0	0·0	15	1	6·6
Three scars - -	39	0	0·0	21	0	0·0
Four scars - -	37	0	0·0	46	1	2·1
Totals - -	102	0	0·0	95	3	3·1

These results indicate that foveation of cicatrices is superior in protecting against death as compared with the protecting power of unfoveated scars.

Taking, lastly, into consideration the influence of the combined area of the vaccination scars of the individuals attacked, upon the nature of attack, the following are the results:—

TABLE XVI.

Age Periods.	Area of Scar under ·25 sq. in.		Area of Scar from ·25 to ·5 sq. in.		Area of Scar over ·5 sq. in.	
	Discrete.	Confluent.	Discrete.	Confluent.	Discrete.	Confluent.
0 to 1 year - -	0	0	0	0	1	0
1 to 5 years -	0	0	2	0	3	0
5 to 10 years -	1	0	6	0	4	0
10 to 15 years -	4	1	7	1	10	0
15 to 20 years -	4	0	9	0	18	1
20 to 30 years -	5	2	12	0	18	2
30 to 40 years -	3	1	5	1	2	2
40 years and over -	2	1	3	1	3	0
Totals - -	19	5	44	3	59	5

If these figures are worked out so as to show the per-centages of confluent attacks at all ages when the area of the vaccination scars is respectively under ·25 sq. in., from ·25 to ·5 sq. in., and over ·5 sq. in., the following table is obtained:—

TABLE XVII.

All Ages.

—	Area of Scars under 0·25 sq. in.	Area of Scars from 0·25 to 0·5 sq. in.	Area of Scars over 0·5 sq. in.
Per-centages of confluent attacks.	21	6	7

or if the figures are worked so as to show the per-centages of very mild attacks at all ages when the area of the vaccination scars is respectively under ·25 sq. in., from ·25 to ·5 sq. in., and over ·5 sq. in., the following table is obtained:—

TABLE XVIII.

All Ages.

—	Area of Scars under 0·25 sq. in.	Area of Scars from 0·25 to 0·5 sq. in.	Area of Scars over 0·5 sq. in.
Per-centages of very mild attacks.	12	21	45

Reducing these to proportions of discrete to confluent attacks, the results are as follows:—

TABLE XIX.

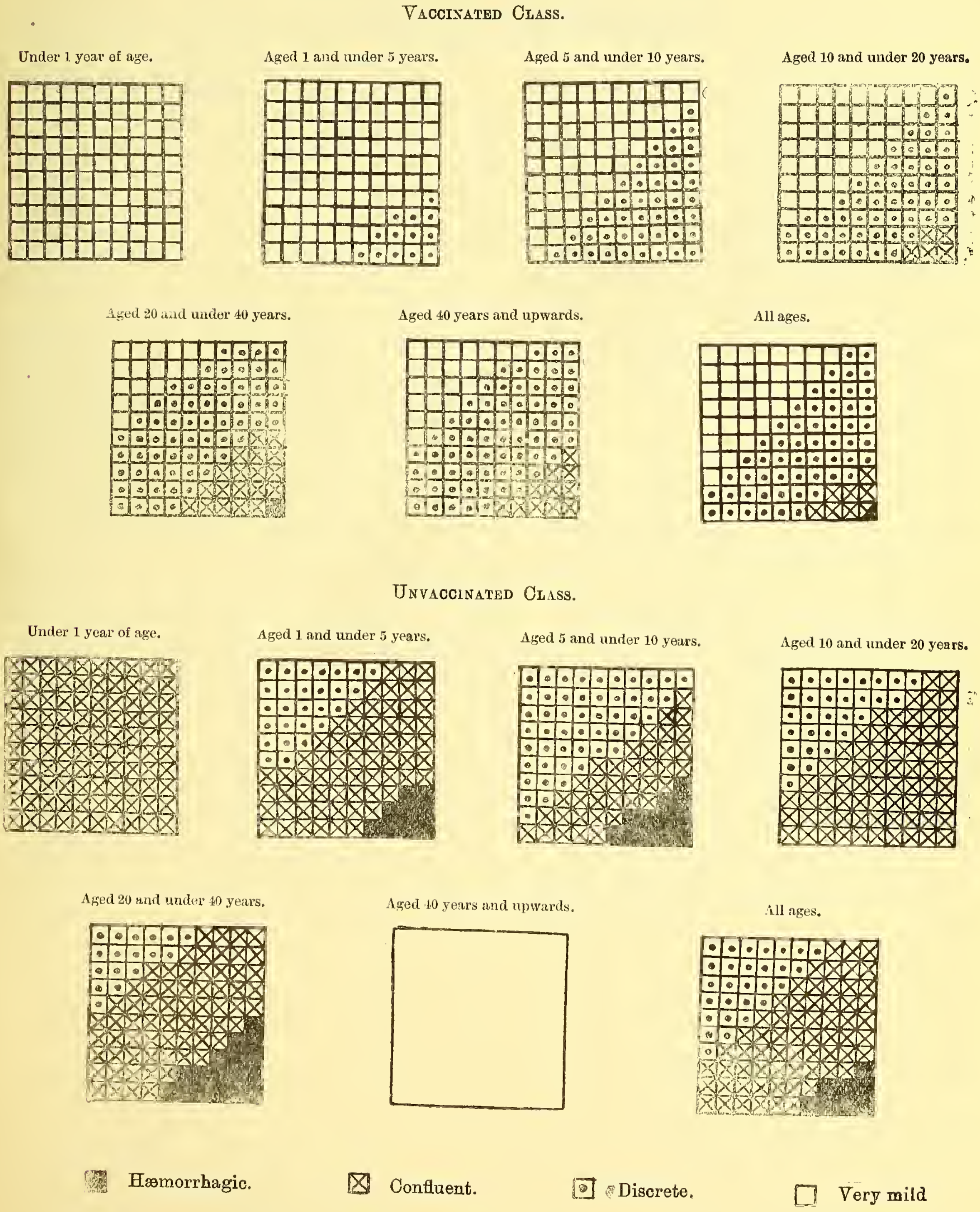
Area of Scars.	Proportion of Discrete to Confluent Cases.
Area of scar under ·25 sq. in.	4 discrete cases to 1 confluent.
Area of scar from ·25 to ·5 sq. in.	15 " " 1 "
Area of scar over ·5 sq. in. -	12 " " 1 "

By looking to the death rates the results are even more striking. These results show that the greater the combined area of the vaccination scars, the greater is the protection against death, and that in the cases in which the combined area was over 0·5 sq. in. no death occurred.

TABLE XX.

Area of Scars.	Cases.	Deaths.	Mortality per Cent.
Area of scar under ·25 sq. in.	24	1	4·1
Area of scar from ·25 to ·5 sq. in.	47	1	2·1
Area of scar over ·5 sq. in.	64	0	0·0

DIAGRAM showing the Proportion of Cases of Small-pox of different Types which occurred in Persons of the "Vaccinated" and "Unvaccinated" Classes respectively at all and certain specified Ages in the London Small-pox Outbreak of 1892.



VACCINATED CLASS.

Under 1 year of age. Aged 1 and under 5 years. Aged 5 and under 10 years. Aged 10 and under 20 years.

Aged 20 and under 40 years. Aged 40 years and upwards. All ages.

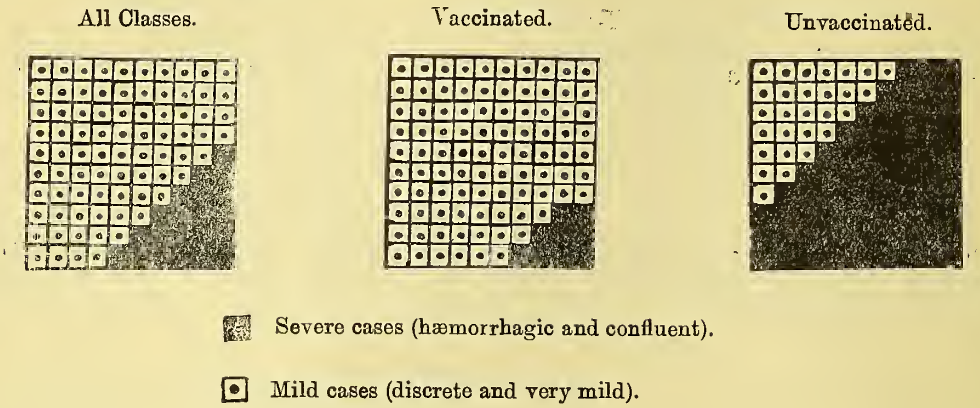
UNVACCINATED CLASS.

Under 1 year of age. Aged 1 and under 5 years. Aged 5 and under 10 years. Aged 10 and under 20 years.

Aged 20 and under 40 years. Aged 40 years and upwards. All ages.

▨ Hæmorrhagic. ☒ Confluent. ▣ Discrete. ☐ Very mild

DIAGRAMS showing the Proportion of Cases of Small-pox of the Severe (Hæmorrhagic and Confluent) and Mild (Discrete and very Mild) Types respectively which occurred in Persons at all Ages of different Classes in the London Outbreak of 1892.



ARTHUR P. LUFF.

B.—Report of Dr. Arthur Pearson Luff on the Outbreak of Small-Pox in London during 1892–3.

This report is practically a continuation of my previous report of the outbreak of small-pox that occurred in London from January 1st, 1892, to August 31st, 1892. At the end of that period a few occasional cases of small-pox occurred in London during September, and, towards the end of September or beginning of October, the outbreak now reported on commenced. The origin of the outbreak could not be traced to any one particular case, the importation of the small-pox in connexion with this outbreak being mainly due to its introduction by tramps and other members of the vagrant class from the provinces into London. During the outbreak, but especially at its commencement, the principal foci of infection were, common lodging-houses, casual wards, and Salvation Army shelters, where the members of the migratory and vagrant classes especially congregated. The small-pox in several groups of cases spread with great rapidity amongst the children at various schools, and several illustrations of such spread of infection will be found in the forms marked "A." and "B.," which I forward to the Commission with this report.* Apart from the prevalence of the epidemic amongst tramps and members of the vagrant class, and amongst school-children, those that have been most affected appear to have been, (*a*) men employed in carrying and handling cases of fruit either at the docks, in the markets, or in shops; (*b*) book-folders; (*c*) printers; (*d*) cigar and cigarette makers, and (*e*) employés in the fur trade.

Through the courtesy of Mr. T. Duncombe Mann, the Secretary of the Metropolitan Asylums Board, notification lists of all the small-pox cases that had been notified in London have been transmitted to me as soon as they were received by the Board. As soon as possible after the receipt of these notification lists, visits have been made by myself and by the assistants placed at my disposal by the Treasury, to the houses or places where the cases occurred, and in this way thorough inquiries into the individual cases have been instituted, and, where it has been possible to see the patients, examinations and measurements of the vaccination scars have been made. In addition, I have availed myself of the very thorough examinations that are made of the patients admitted to the hospital ships at Long Reach, and I am greatly indebted both to the officials of the Metropolitan Asylums Board, and to Dr. Ricketts, the Medical Superintendent at the Hospital Ships, for the way in which they have placed all information obtainable at my disposal. I am also much indebted for various particulars that have been kindly furnished me from time to time by the Medical Officers of Health for the different London districts. On the forms marked "A." will be found the particulars of the individual cases and also the source or sources of infection which have been traced in the majority of cases. Fuller particulars of the individual cases will be found on the forms marked "B."

From September 1892 to July 31st, 1893, I received from the Metropolitan Asylums Board notifications of 2,726 cases of small-pox. Of these, 2,087 proved, on instituting inquiries, to be cases of small-pox. 127 of the cases proved to be cases of chicken-pox. 86 of the cases proved to be neither small-pox nor chicken-pox, but some other disease, in several of the cases the disease being syphilis. The remaining 426 were cases that had been notified to me twice over. Of the 2,087 cases of small-pox I have obtained the following particulars. Whether vaccinated, re-vaccinated, or unvaccinated, information has been obtained in 2,074 cases, no information beyond the fact of infection with small-pox in 13 cases. (In connection with these cases no information could be obtained, owing to the people having removed and left no addresses, but in none of these cases could I hear of any instance of death having occurred.) Of the 2,074 cases, I ascertained that 295 (14·2 per cent. of the whole) occurred in children under 10 years of age. Of the 2,074 cases that were successfully inquired into, 370 were unvaccinated, and in 165 other cases the vaccination was doubtful by reason of absence of marks from the arm, no scars being visible in any of these 165 cases. Deducting these 535 cases (unvaccinated and doubtful vaccination cases) from the 2,074 cases, 1,539 cases are left representing those who had been vaccinated, thus:—

Cases concerning which information was obtained:

Vaccinated cases - -	1,539
Unvaccinated cases - -	370
Doubtful vaccination cases -	165
	2,074

Of the 1,539 cases that had been vaccinated the following particulars were obtained:—

As to whether re-vaccinated or not in all the cases.
Number of vaccination scars in 1,383 cases.
Foveation or not of the vaccination scars in 1,383 cases.
Area of the vaccination scars in 1,205 cases.

The meanings attached to the terms "vaccinated class," "re-vaccinated class," and "unvaccinated class" in this report are the same as those given in my previous report, and in Dr. Barry's Report on the Sheffield Small-pox Epidemic of 1887 to 1888. "'Vaccinated "class' includes all persons successfully vaccinated at "any period exceeding 13 days prior to the appearance "on them of the eruption of small-pox."

"'Unvaccinated class' includes all persons who have "either never been successfully vaccinated, or whose "vaccination was performed for the first time within 13 "days of the appearance on them of the eruption of "small-pox."

"'Re-vaccinated class' includes all persons successfully re-vaccinated at any period exceeding 13 days "prior to the appearance on them of the eruption of "small-pox."

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* *Not here reproduced.*

TABLE I.

Age Period.	No.	Deaths.	All Cases.					VACCINATED																										
			Nature of Attack.					Nature of Attack in reference to Number																								
								One Scar.										Two Scars.										Three				
								Foveated.					Unfoveated.					Foveated.					Unfoveated.					Foveated.				
								Nature of Attack.					Nature of Attack.					Nature of Attack.					Nature of Attack.					Nature of Attack.				
			Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.	Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.	Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.	Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.	Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.	Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.
Under 1 year.	27	19	1				0	0				0	0				0	0				0	0				0	0				0
				9			3		0			0		0			0		0			0		0			0		0			0
					8		8			0		0			0		0			0		0			0		0			0		0
						9	8				0	0				0	0				0	0				0	0				0	0
1 to 5 years.	103	21	0				0	0				0	0				0	0				0	0				0	0				0
				46			2		1			0		0			0		1			0		2			0		0			0
					19		0			0		0			0		0			0		0			0		0			0		0
						38	19				0	0				0	0				0	0				0	0				0	0
5 to 10 years.	165	14	4				0	0				0	0				0	1				0	0				0	1				0
				92			1		4			0		2			0		6			0		1			0		10			0
					22		0			0		0			0		0			0		0			0		0			1		0
						47	13				0	0				0	0				0	0				0	0				1	0
10 to 15 years.	197	8	4				0	0				0	0				0	1				0	0				0	0				0
				156			0		5			0		7			0		13			0		5			0		9			0
					8		0			0		0			1		0			0		0			0		0			1		0
						29	8				0	0				0	0				0	0				0	0				0	0
15 to 20 years.	288	6	4				0	0				0	0				0	0				0	0				0	1				0
				243			2		11			0		12			0		29			0		5			0		43			1
					5		0			0		0			1		0			0		0			0		0			0		0
						36	4				1	0				1	0				0	0				1	0				1	0
20 to 30 years.	617	28	11				0	0				0	0				0	0				0	0				0	5				0
				523			3		56			1		20			0		85			0		26			0		95			0
					20		1			2		0			0		0			0		0			3		1			0		0
						63	24				0	0				4	2				4	2				4	2				5	1
30 to 40 years.	362	26	8				0	0				0	0				0	1				0	0				0	0				0
				297			2		34			1		25			0		43			0		27			0		44			0
					7		2			1		1			1		0			2		0			0		0			0		0
						50	22				7	2				5	0				0	0				4	3				3	0
40 years and upwards.	315	35	1				0	0				0	0				0	0				0	0				0	1				0
				256			7		26			0		36			0		27			0		24			0		15			0
					7		0			0		0			2		0			0		0			0		0			1		0
						51	28				3	1				2	0				1	1				4	2				2	1
Totals.	2,074	157	33				0	0				0	0				0	3				0	0				0	8				0
				1622			20		137			2		102			0		204			0		90			0		216			1
					96		11			3		1			5		0			2		0			3		1			3		0
						323	126				11	3				12	2				5	3				13	7				12	2

TABLE I.

Cases.																																		
and Character of Scars.															Nature of Attack in reference to Area of Scars.															No. and Area of Scars unknown.				
Scars.					Four Scars or more.										Area under ¼ sq. Inch.					Area from ¼ to ½ sq. Inch.					Area over ½ sq. Inch.									
Unfoveated.					Foveated.					Unfoveated.																								
Nature of Attack.					Nature of Attack.					Nature of Attack.					Nature of Attack.					Nature of Attack.					Nature of Attack.					Nature of Attack.				
Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.	Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.	Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.	Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.	Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.	Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.	Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.
0				0	0				0	0				0	0				0	0				0	0				0	0				0
	0			0		0			0		0			0		0			0		0			0		0			0		3			0
		0		0			0		0			0		0			0		0			0		0			0		0			0		0
			0	0				0	0				0	0				0	0				0	0				0	0				0	0
0				0	0				0	0				0	0				0	0				0	0				0	0				0
	0			0		2			0		1			0		3			0		2			0		1			0		5			0
		0		0			0		0			0		0			0		0			0		0			0		0			0		0
			0	0				0	0				0	0				0	0				0	0				0	0				0	0
1				0	1				0	0				0	1				0	3				0	0				0	0				0
	2			0		10			0		6			0		9			0		13			0		16			0		9			0
		0		0			0		0			0		0			1		0			0		0			0		0			0		0
			0	0				0	0				0	0				0	0				1	0				0	0				0	0
0				0	3				0	0				0	0				0	2				0	2				0	0				0
	6			0		46			0		21			0		16			0		23			0		60			0		15			0
		0		0			0		0			0		0			1		0			1		0			0		0			0		0
			0	0				0	0				0	0				0	0				0	0				0	0				0	0
0				0	2				0	0				0	0				0	1				0	2				0	0				0
	10			0		75			1		28			0		21			0		37			1		138			1		9			0
		0		0			0		0			0		0			0		0			0		0			0		0			0		0
			0	0				1	0				0	0				0	0				0	0				1	0				0	0
0				0	3				0	1				0	0				0	1				0	8				0	2				0
	24			0		115			0		32			1		57			0		111			1		244			1		38			0
		0		0			0		0			1		0			2		0			1		0			2		1			0		0
			5	1				1	1				1	0				3	0				3	1				10	5				3	1
1				0	3				0	2				0	0				0	2				0	4				0	1				0
	25			0		28			1		26			0		41			1		76			0		102			1		27			0
		1		1			0		0			0		0			3		1			1		0			0		0			0		0
			3	0				2	1				0	0				8	1				7	3				6	2				2	2
0				0	0				0	0				0	0				0	1				0	0				0	0				0
	22			1		20			0		20			0		54			0		51			0		38			0		35			2
		1		0			0		0			0		0			1		0			0		0			1		0			2		0
			1	0				0	0				1	1				6	2				1	1				3	1				3	0
2				0	12				0	3				0	1				0	10				0	16				0	3				0
	89			1		296			2		134			1		201			1		313			2		599			3		143			2
		2		1			0		0			1		0			8		1			3		0			3		1			2		0
			9	1				4	2				2	1				19	3				12	5				20	8				8	3

TABLE I—*continued.*

Age Period.	Re-vaccinated													
	Re-vaccinated Once.							Re-vaccinated Twice.						
	No.	Deaths.	Nature of Attack.					No.	Deaths.	Nature of Attack.				
			Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.			Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.
Under 1 year - -	0	0	0	0	0	0	0 0 0 0	0	0	0	0	0	0	0 0 0 0
1 to 5 years - - -	0	0	0	0	0	0	0 0 0 0	0	0	0	0	0	0	0 0 0 0
5 to 10 years - -	1	0	0	1	0	0	0 0 0 0	0	0	0	0	0	0	0 0 0 0
10 to 15 years - -	0	0	0	0	0	0	0 0 0 0	0	0	0	0	0	0	0 0 0 0
15 to 20 years - -	5	0	0	5	0	0	0 0 0 0	0	0	0	0	0	0	0 0 0 0
20 to 30 years - -	22	0	2	20	0	0	0 0 0 0	1	0	0	1	0	0	0 0 0 0
30 to 40 years - -	31	1	2	27	0	2	0 0 0 1	4	0	0	3	0	1	0 0 0 0
40 years and upwards -	28	2	0	26	0	2	0 1 0 1	4	0	0	4	0	0	0 0 0 0
Totals - - -	87	3	4	79	0	4	0 1 0 2	9	0	0	8	0	1	0 0 0 0

TABLE I—*continued.*

Cases.							Vaccination doubtful. No Scars visible.							Unvaccinated Cases.						
Re-vaccinated Three Times or more.																				
No.	Deaths.	Nature of Attack.					No.	Deaths.	Nature of Attack.					No.	Deaths.	Nature of Attack.				
		Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.			Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.			Very mild.	Discrete.	Severe discrete.	Confluent.	Deaths.
0	0	0	0	0	0	0 0 0 0	0	0	0	0	0	0	0 0 0 0	24	19	1	6	8	9	0 3 8 8
0	0	0	0	0	0	0 0 0 0	4	1	0	1	1	2	0 0 0 1	87	20	0	33	18	36	0 2 0 18
0	0	0	0	0	0	0 0 0 0	15	5	0	4	2	9	0 0 0 5	94	9	0	38	19	37	0 1 0 8
0	0	0	0	0	0	0 0 0 0	16	0	0	10	0	6	0 0 0 0	47	8	0	18	6	23	0 0 0 8
0	0	0	0	0	0	0 0 0 0	22	1	0	9	3	10	0 0 0 1	34	3	1	11	1	21	0 0 0 3
0	0	0	0	0	0	0 0 0 0	29	7	0	12	3	14	0 0 0 7	53	8	0	20	11	22	0 1 0 7
1	0	1	0	0	0	0 0 0 0	29	9	0	15	2	12	0 0 0 9	15	5	0	3	0	12	0 0 0 5
0	0	0	0	0	0	0 0 0 0	50	13	0	29	0	21	0 3 0 10	16	13	0	2	1	13	0 1 0 12
1	0	1	0	0	0	0 0 0 0	165	36	0	80	11	74	0 3 0 33	370	85	2	131	64	173	0 8 8 69

Table I. gives :—

(1.) The number of attacks at different age periods.
(2.) The number of deaths.
(3.) The nature of the attack and the number of deaths occurring with each variety of small-pox.
(4.) The influence of the number, and the foveation or not of the vaccination scars; and the area of the vaccination scars on (*a*) the nature of the attacks, (*b*) the mortality.
(5.) The number of attacks amongst those who were known to have been vaccinated, but in connexion with whom the number and nature of the scars could not be ascertained. The nature of the attack and the mortality is also given in this column.
(6.) The influence of re-vaccination on (*a*) the nature of the attack, (*b*) the mortality.
(7.) The number of doubtful cases of vaccination with the nature of the attack and the mortality.
(8.) The number of unvaccinated cases with the nature of the attack and the mortality.

In all these groups special columns show the number of deaths that occurred with each variety of small-pox. In connexion with this report the cases of hæmorrhagic small-pox have been classed with the confluent under the heading "confluent." The actual number of hæmorrhagic cases that occurred was 11.

Of the 1,539 cases occurring among vaccinated persons, 36 proved fatal; of the 370 cases occurring among unvaccinated persons, 85 proved fatal; of the 165 cases occurring among persons whose vaccination was doubtful, 36 proved fatal. These figures converted to percentages give the following results :—

TABLE II.

Fatality as a Per-centage among the Vaccinated and Unvaccinated.

Per-centage of Vaccinated.	Per-centage among those whose Vaccination was doubtful.	Per-centage of Unvaccinated.
2·3	21·8	22·9

A comparison of the fatality as a per-centage among the total sufferers, the vaccinated cases, the cases of doubtful vaccination, and the unvaccinated cases gives the following results :—

TABLE III.

——	No.	Deaths.	Per-centage of Deaths.
Total sufferers - -	2,074	157	7·5
Vaccinated cases -	1,539	36	2·3
Doubtful cases - -	165	36	21·8
Unvaccinated cases -	370	85	22·9

From this table it is seen that the mortality amongst the unvaccinated cases was nearly 10 times that of the vaccinated class. Had the unvaccinated cases died at the rate of the vaccinated class, in place of the 85 deaths there would have been between 8 and 9 deaths. Had the vaccinated cases died at the rate of the unvaccinated class, in place of 36 deaths there would have been 353.*

With regard to the mortality at different ages among the vaccinated and unvaccinated cases (all reference to "doubtful" cases being here and henceforth omitted), the following summary is obtained :—

TABLE IV.

Age Periods.	Vaccinated.			Unvaccinated.		
	Cases.	Deaths.	Per-centage of Deaths.	Cases.	Deaths.	Per-centage of Deaths.
0 to 1 year - -	3	0	0·0	24	19	79·1
1 to 5 years -	12	0	0·0	87	20	22·9
5 to 10 years -	56	0	0·0	94	9	9·5
10 to 15 years -	134	0	0·0	47	8	17·0
15 to 20 years -	232	2	0·8	34	3	8·8
20 to 30 years -	535	13	2·4	53	8	15·0
30 to 40 years -	318	12	3·7	15	5	33·3
40 years and over -	249	9	3·6	16	13	81·2

From this table it is seen that under 10 years of age no deaths occurred among the vaccinated; whereas among the unvaccinated under 10 years of age who caught small-pox 23·4 per cent. of deaths occurred. Over 10 years of age the per-centage of deaths among the vaccinated was 2·4, and among the unvaccinated 22·4. The table also shows that vaccination gave absolute protection against death up to the age of 15 years, whereas among the unvaccinated cases up to 15 years of age the fatality was 22·2 per cent.

Proceeding now to the consideration of the facts as to the nature or severity of attack among the vaccinated and unvaccinated, the following are the results :—

TABLE V.

For all Ages.

Nature of Attack.	Vaccinated.	Unvaccinated.
Very mild - - -	31	2
Discrete - - -	1,411	131
Severe discrete - -	21	64
Confluent - - -	76	173
Totals - - -	1,539	370

From this table it is seen that of the 1,539 vaccinated persons attacked, 76, or 4·9 per cent., had confluent small-pox, whereas of the 370 unvaccinated persons attacked, 173, or 46·7 per cent., had confluent small-pox. Putting the severe discrete and confluent cases together, it appears that 6·3 per cent. of the vaccinated had bad attacks, whilst 64·0 per cent. of the unvaccinated had bad attacks. The chances of a bad attack among the unvaccinated as compared with the vaccinated being 10 to 1. In connexion with the 76 cases of confluent small-pox occurring in vaccinated persons, 24 deaths (a mortality of 31·5 per cent.) occurred, and in connexion with the 173 cases of confluent small-pox occurring in unvaccinated persons, 69 deaths (a mortality of 39·8 per cent.) occurred.

If now the figures are taken as to the nature or severity of attack among the vaccinated and unvaccinated under 10 years of age, the following results are obtained :—

TABLE VI.

Under 10 Years of Age.

Nature of Attack.	Vaccinated.	Unvaccinated.
Very mild - - -	4	1
Discrete - - -	65	77
Severe discrete - -	1	45
Confluent - - -	1	82

---

* Had the cases of doubtful vaccination died at the rate of the vaccinated class, in place of the 36 deaths, there would have been 3·8 deaths; had they died at the rate of the unvaccinated class in place of the 36 deaths, there would have been 37·9 deaths.

Putting the severe discrete and confluent cases together, it can be calculated from this table that under 10 years of age 2·8 per cent. of the vaccinated had bad attacks, whereas 61·9 per cent. of the unvaccinated had bad attacks.

With regard to the facts obtained as to the nature or severity of attack, and the per-centages of deaths among the vaccinated, re-vaccinated, and unvaccinated classes, the results are arranged in Table VII.

TABLE VII.

—	No. of Cases.	Nature of Attack.		Number of Deaths.	Per-centage of Deaths.
		Mild.	Severe.		
Vaccinated once -	1,442	1,350	92	33	2·2
Re-vaccinated -	97	92	5	3	3·0
Unvaccinated -	370	133	237	85	22·9

As regards the age incidence of the vaccinated and unvaccinated persons attacked, the following are the numbers :—

TABLE VIII.

Age Incidence of Vaccinated Persons attacked.

Under 10 Years.	Over 10 Years.
71	1,468

Age Incidence of Unvaccinated Persons attacked.

Under 10 Years.	Over 10 Years.
205	165

From these numbers it is seen that amongst the vaccinated comparatively very few were attacked under 10 years of age, whereas amongst the unvaccinated the greater number of attacks occur under 10 years of age. With regard to the re-vaccinated cases, of the 1,539 vaccinated cases, 97 had been re-vaccinated, and of these 97 re-vaccinated cases, 87 had been re-vaccinated once, 9 had been re-vaccinated twice, and one had been re-vaccinated three times. Reducing these numbers of the re-vaccinated cases to per-centages of the total vaccinated cases, the following table is obtained :—

TABLE IX.

—	Nos.	Re-vaccinated Cases stated as Per-centages of Total Vaccinated Cases.
Re-vaccinated once -	87	5·6
Re-vaccinated twice -	9	0·5
Re-vaccinated three times -	1	0·06

With regard to the facts as to the nature of attack and the mortality among the vaccinated, the 1,539 cases of vaccination resolve themselves thus :—(In this table 3 deaths occurring among vaccinated persons and which are classed among the deaths in Table I. are omitted, since, on inquiry, it was ascertained that death in these 3 cases did not occur from small-pox. They were all cases of discrete small-pox, and in one of them death was due to rheumatic fever and heart disease, in the second to pneumonia, and in the third to convulsions.)

TABLE X.

VACCINATED CASES.

Nature of Attack.	No.	Deaths.
Very mild - - -	31	0
Discrete - - -	1,411	6
Severe discrete - -	21	3
Confluent - - -	76	24

Setting out the facts in tabular fashion as to the nature of attack at different ages among the vaccinated, the following table is obtained :—

TABLE XI.

VACCINATED CASES.

Age Periods.	Nature of Attack.				Per-centage of Cases.			
	Very mild.	Discrete.	Severe discrete.	Confluent.	Very mild.	Discrete.	Severe discrete.	Confluent.
0 to 1 year -	0	3	0	0	0·0	100·0	0·0	0·0
1 to 5 years -	0	12	0	0	0·0	100·0	0·0	0·0
5 to 10 years -	4	50	1	1	7·1	89·3	1·8	1·8
10 to 15 years -	4	128	2	0	3·0	95·5	1·5	0·0
15 to 20 years -	3	223	1	5	1·3	96·1	0·5	2·1
20 to 30 years -	11	491	6	27	2·1	91·8	1·1	5·0
30 to 40 years -	8	279	5	26	2·5	87·8	1·6	8·1
40 years and over -	1	225	6	17	0·4	90·3	2·4	6·9

From this table it is seen that up to five years of age small-pox in vaccinated persons was entirely of a mild nature, and that from 5 to 20 years of age it only appeared among the vaccinated in a severe form in a small proportion of the cases ; whereas after 20 years of age the proportion of the severe cases is much greater.

The data obtained showing the relation existing between the number of vaccination scars and the nature of attack give the following results :—

TABLE XII.

Age Periods.	One Scar.		Two Scars.		Three Scars.		Four Scars.	
	Discrete.	Severe and Confluent.	Discrete.	Severe and Confluent.	Discrete.	Severe and Confluent.	Discrete.	Severe and Confluent.
0 to 1 year - -	0	0	0	0	0	0	0	0
1 to 5 years -	1	0	3	0	0	0	3	0
5 to 10 years -	6	0	8	0	14	2	17	0
10 to 15 years -	12	1	19	0	15	1	70	0
15 to 20 years -	23	3	34	1	54	1	105	1
20 to 30 years -	76	6	111	11	124	10	151	3
30 to 40 years -	59	14	71	6	70	7	59	2
40 years and over -	62	7	51	5	38	5	40	1
Total - -	239	31	297	23	315	26	445	7

From this table the following relative numbers of discrete and severe discrete or confluent attacks in relation to the number of vaccination scars can be deduced :—

For all Ages.

1 scar.—8 cases of discrete to 1 case of severe or confluent occurred.

2 scars.—13 cases of discrete to 1 case of severe or confluent occurred.

3 scars.—12 cases of discrete to 1 case of severe or confluent occurred.

4 scars.—63 cases of discrete to 1 case of severe or confluent occurred.

Under 20 *Years of Age.*

1 scar.—10 cases of discrete to 1 case of severe or confluent occurred.

2 scars.—64 cases of discrete to 1 case of severe or confluent occurred.

3 scars.—21 cases of discrete to 1 case of severe or confluent occurred.

4 scars.—195 cases of discrete to 1 case of severe or confluent occurred.

These results fairly bear out the conclusion that the greater the number of vaccination scars, the less severe is the nature of the attack.

Taking next into consideration the influence of foveated and unfoveated scars upon the nature of attack, the following are the results :—

TABLE XIII.

Age Periods.	One Scar.				Two Scars.				Three Scars.				Four Scars.			
	Foveated.		Unfoveated.		Foveated.		Unfoveated.		Foveated.		Unfoveated.		Foveated.		Unfoveated.	
	Discrete.	Severe and Confluent.	Discrete.	Severe and Confluent.	Discrete.	Severe and Confluent.	Discrete.	Severe and Confluent.	Discrete.	Severe and Confluent.	Discrete.	Severe and Confluent.	Discrete.	Severe and Confluent.	Discrete.	Severe and Confluent.
0 to 1 year - - -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1 to 5 years - - -	1	0	0	0	1	0	2	0	0	0	0	0	2	0	1	0
5 to 10 years - -	4	0	2	0	7	0	1	0	11	2	3	0	11	0	6	0
10 to 15 years - -	5	0	7	1	14	0	5	0	9	1	6	0	49	0	21	0
15 to 20 years - -	11	1	12	2	29	0	5	1	44	1	10	0	77	1	28	0
20 to 30 years - -	56	2	20	4	85	4	26	7	100	5	24	5	118	1	33	2
30 to 40 years - -	34	8	25	6	44	2	27	4	44	3	26	4	31	2	28	0
40 years and over - -	26	3	36	4	27	1	24	4	16	3	22	2	20	0	20	1
Total cases - -	137	14	102	17	207	7	90	16	224	15	91	11	308	4	137	3

Reducing these to per-centages of severe and confluent attacks among those of all ages having foveated or unfoveated vaccination scars, the results are as follows :—

TABLE XIV.

All Ages.

—	One Scar.		Two Scars.		Three Scars.		Four Scars,	
	Foveated.	Unfoveated.	Foveated.	Unfoveated.	Foveated.	Unfoveated.	Foveated.	Unfoveated.
Per-centages of severe and confluent attacks.	9·2	14·2	3·2	15·0	6·2	10·7	1·2	2·1

This table shows that a considerably higher per-centage of severe and confluent attacks occur among those having unfoveated scars than among those having foveated scars. This becomes more apparent if the figures are lumped together under each of the sub-headings, when the following results are obtained :—

TABLE XV.

No of Scars.	Foveated.		Unfoveated.	
	Discrete.	Severe and Confluent.	Discrete.	Severe and Confluent.
One scar - -	137	14	102	17
Two scars - -	207	7	90	16
Three scars - -	224	15	91	11
Four scars - -	308	4	137	3
Total cases -	876	40	420	47
Per-centages -	95·7	4·3	90·0	10·0

This shows that more than twice as many cases of severe discrete and confluent small-pox occurred among those having unfoveated vaccination scars as among those having foveated scars. By looking to the death rates the results bear out a similar conclusion.

TABLE XVI.

No. of Scars.	Foveated.			Unfoveated.		
	Cases.	Deaths.	Mortality per Cent.	Cases.	Deaths.	Mortality per Cent.
One scar - -	151	5	3·3	119	2	1·6
Two scars - -	214	3	1·4	106	8	7·5
Three scars - -	239	2	0·8	102	3	2·9
Four scars - -	312	3	0·9	140	2	1·4
Totals - -	916	13	1·4	467	15	3·2

These results indicate that foveation of cicatrices is superior in protecting against death as compared with unfoveated scars.

Taking, lastly, into consideration the influence of the combined area of the vaccination scars upon the nature of attack, the following are the results:—

TABLE XVII.

Age Periods.	Area of Scars under ·25 sq. in.		Area of Scars from ·25 to ·5 sq. in.		Area of Scars over .5 sq. in.	
	Discrete.	Severe and Confluent.	Discrete.	Severe and Confluent.	Discrete.	Severe and Confluent.
0 to 1 year -	0	0	0	0	0	0
1 to 5 years -	3	0	2	0	1	0
5 to 10 years -	10	1	16	1	16	0
10 to 15 years -	16	1	25	1	62	0
15 to 20 years -	21	2	38	0	140	1
20 to 30 years -	57	5	112	4	252	12
30 to 40 years -	41	11	78	8	106	6
40 years and over -	54	7	52	1	38	4
Totals -	202	27	323	15	615	23

If these figures are worked out so as to show the percentages of severe and confluent attacks at all ages when the area of the vaccination scar is respectively under ·25 square inch, from ·25 to ·5 square inch, and over ·5 square inch, the following table is obtained:—

TABLE XVIII.

ALL AGES.

—	Area of Scars under ·25 sq. in.	Area of Scars from ·25 to ·5 sq. in.	Area of Scars over ·5 sq. in.
Per-centages of severe and confluent attacks	11·7	4·4	3·6

or, if the figures are worked out so as to show the percentages of very mild attacks at all ages, when the area of the vaccination scars is respectively under ·25 square inch, from ·25 to ·5 square inch, and over ·5 square inch, the following Table is obtained:—

TABLE XIX.

ALL AGES.

—	Area of Scars under ·25 sq. in.	Area of Scars from ·25 to ·5 sq. in.	Area of Scars over ·5 sq. in.
Per-centages of very mild attacks	0·4	2·9	2·5

Reducing the figures of Table XVII to proportions of discrete to confluent attacks, the results are as follows:—

TABLE XX.

Area of Scars.	Proportion of Discrete to Confluent cases.
Area of scars under ·25 sq. in.	7 Discrete cases to 1 Confluent
Area of scars from ·25 to ·5 sq. in.	21 " "
Area of scars over ·5 sq. in.	26 " " "

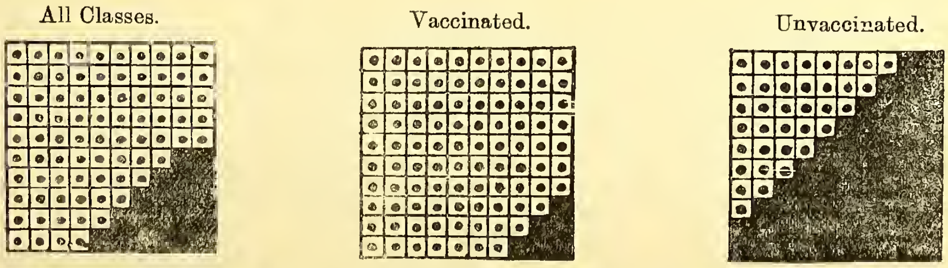
By looking to the death rates similar results are obtained:—

TABLE XXI.

Area of Scars.	Cases.	Deaths.	Mortality per Cent.
Area of scar under ·25 sq. in.	229	5	2·1
Area of scars from ·25 to ·5 sq. in.	338	6	1·7
Area of scar over ·5 sp. in.	638	10	1.5

The results shown in Tables XVIII., XIX., XX., and XXI. show that the greater the combined area of the vaccination scars the greater is the protection against a bad attack of small-pox, and also the lower is the death-rate.

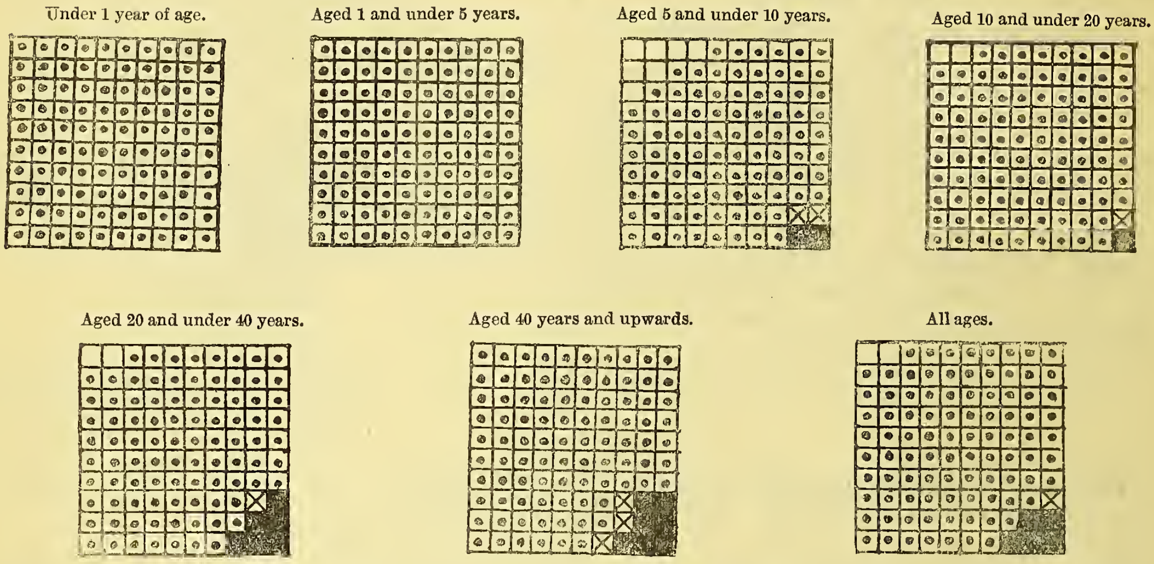
DIAGRAM showing the Proportion of Cases of Small-pox of the Mild (including very mild and Discrete Cases), and Severe (including Severe Discrete, Confluent, and Hæmorrhagic Cases) Types respectively, which occurred in Persons at all Ages of different classes in the London Small-pox Outbreak from September 1st, 1892, to July 31st, 1893.


All Classes. Vaccinated. Unvaccinated.

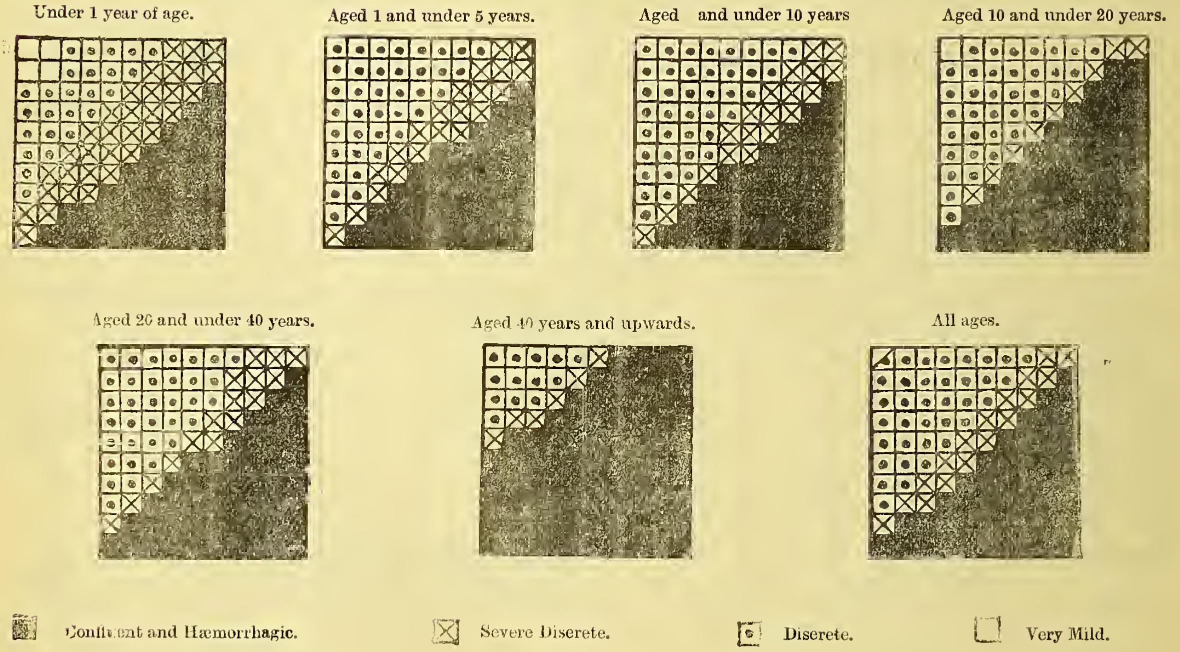
■ Severe. ▣ Mild.

Diagram showing the Proportion of Cases of Small-pox of different Types which occurred in Persons of the "Vaccinated" and "Unvaccinated" Classes respectively at all and certain specified Ages in the London Small-pox Outbreak from September 1st, 1892, to July 31st, 1893.

Vaccinated Class.



Unvaccinated Class.



These diagrams show at a glance the proportion of cases of small-pox of different types which occurred at all and certain specified ages among the vaccinated and unvaccinated classes respectively.

ARTHUR P. LUFF.

VACCINATION COMMISSION.

APPENDIX V.

TO THE

FINAL REPORT

OF THE

ROYAL COMMISSION ON VACCINATION.

REPORT TO THE COMMISSION OF

DR. THOMAS DIXON SAVILL

ON THE OUTBREAK OF SMALL-POX IN THE BOROUGH OF WARRINGTON IN 1892-3.

Presented to both Houses of Parliament by Command of Her Majesty.

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Report of Dr. Thomas Dixon Savill on the Outbreak of Small-pox in the Borough of Warrington in 1892–3.

INTRODUCTION.

Advantages special to this inquiry.

The Warrington small-pox epidemic of 1892–93 offers certain advantages for the observation of that malady as it occurs in the present day, and for the investigation of those circumstances connected both with the individual and his surroundings which may influence the propagation and severity of the disease.

1. The study of the malady has been carried on in recent years very largely among small-pox patients after their admission to the small-pox hospitals. But in a community having reasonable and well-defined limits, like the Borough of Warrington, one is enabled to study pretty closely the conditions of all the people exposed to infection, both those attacked and *those also who escaped*. For example, by personal house-to-house inspection it was possible to ascertain the vaccinated condition of *all the persons in the infected houses*, upwards of 2,500 in number. Of these 107 were unvaccinated—of whom 56 per cent. were attacked and 19 per cent. died; and 1,500 were " well vaccinated "—of whom 21 per cent. were attacked and 0·6 per cent. died. (Table X.).

2. The inhabitants of Warrington very largely consist of the artisan and labouring classes, living in houses of a very uniform type (photo. p. 81), and under very similar conditions of home and social life. The disease arose almost entirely amongst these folk and presented, therefore, none of those mixed hygienic or social conditions which would lead to fallacy.

3. The proportion of persons who had been vaccinated once in their lives was unusually high, whereas very few had been revaccinated in the infected houses, or, so far as could be judged, in the town generally, previous to the epidemic; and thus is offered a good opportunity for the study of small-pox in relation to primary vaccination as distinct from revaccination.

4. Small-pox was in former times endemic in Warrington, and 120 years ago the town was the scene of an outbreak of small-pox the like of which has not been known in modern times. The valuable records of this epidemic, given in the proceedings of the Royal Society, and other publications of that epoch, will enable one, with some degree of accuracy to gauge the remarkable differences between the epidemic of 1773 and that of 1892–3. These records show that the mean annual death-rate from the disease in 1773 was 24 times as great as that of 1892–3.

5. Finally, the distribution of the infected houses is a feature which adds still further to the interest and importance of the inquiry in relation to the question whether small-pox was, in this outbreak, spread by means of aërial diffusion. A large number of cases arose, at first, in the neighbourhood of the Old Borough Fever Hospital, while small-pox patients were there admitted. Subsequently, a temporary small-pox hospital was provided in the northern part of the town, and then an undue proportion of houses became infected in its neighbourhood.

Division of Subject.

The evidence revealed during this enquiry will be grouped into four divisions:
Part I. gives the origin and progress of the small-pox epidemic in the borough, and the action taken by the local authorities. It also presents a statement of the cost incurred.

Part II. is devoted to the relation of vaccination to small-pox. An account of the historical epidemic of 1773 is also given, and of the occurrence of small-pox in Warrington so far as it is known since that date.

Part III. deals with those measures especially directed against infectious disease—recognition, notification, removal of patient, quarantine of friends, hospital provision. The concluding sections of this part also deal with the evidence for and against the hypothesis of infection, during this outbreak, by aërial currents.

Part IV. refers to various social, hygienic, and other conditions which might be regarded as contributory causes of the outbreak; such as locality, houses, sanitation, refuse removal, water supply, geology, meteorology, and the occupations and habits of the people.

Only such facts are recorded as have borne full investigation and confirmation, and no pains have been spared with this object in view. The enquiry extended from December 1st, 1892, four months after the epidemic really started, to February 19th, 1894; and the greater part of the time was spent on the spot, in visiting the cases, either in hospital or at home, or both; visiting the other occupants of the infected houses; and making other inquiries necessary to procure first-hand information. The facts so obtained will be given in the fullest manner possible, and on this account the report has come to be of considerable dimensions.

The period dealt with is from May 10, 1892, when a preliminary outbreak commenced, to May 10, 1893, during which time 667 cases occurred in a population of 54,084 persons of whom 62 died. Only 24 cases arose after the latter date, and the temporary hospital was closed in August 1893.

Where evidence has been obtained second-hand, the source has for the most part been acknowledged, but I wish to acknowledge in general terms my indebtedness for valuable assistance received. The Town Clerk Mr. J. Lyon Whittle, the Medical Officer of Health Mr. John H. Gornall, the Assistant Medical Officer of Health Dr. J. Guest Gornall, the Borough Surveyor Mr. Thomas Longdin, the Clerk to the Guardians Mr. James C. Sutton, the Vaccination Officer Mr. George Holford, the Librarian of the Public Free Library Mr. Chas. Madeley, the master and matron of the Workhouse Mr. and Mrs. C. H. Ward, the Manager of the Dallam and Bewsey Forge Mr. Thos. Morris, and the Managers of the other works in the town, have all afforded me valuable information and facilities for investigation.

To Drs. W. E. Fielden and W. W. Lake, who assisted me during part of the time, to Messrs. W. H. Woodcock and Edward Gibbon, whose precision and local knowledge were of the greatest use to me, and to Mr. W. J. Welch, junr., who aided me in the calculations, thanks are specially due for the valuable help they rendered.

Preliminary considerations.

Before presenting a statement of the facts ascertained during my enquiry, I may perhaps be permitted to refer briefly to several points to which certain of the facts relate.

Period of incubation.

The *period of time* which elapses between infection and the development of symptoms of small-pox is in many ways a point of considerable importance in an investigation of this kind. Since the commencement of the inquiry an authoritative statement on the subject has appeared in the Report of a Committee of the Clinical Society of London on Incubation and Contagion.* This committee gives further confirmation of the remarkable constancy of the incubation period of small-pox, and shows that the eruption very generally appears on the 14th day after infection. In 42 out of 54 cases arising after a probable single exposure, given on p. 182 of their Report, it was so. A patient, for example, exposed to infection on December 31st would develop the eruption on January 14th.

Nevertheless, the same authority mentions exceptional cases where this interval has been as short as 12 days and as long as 23 days. Allowance should always be made for such cases, but, when a fixed date is required for calculation, 14 days will be used in the following pages.

Practically this was found to be the period of incubation in the majority of the Warrington cases. The exceptions were not numerous, but it will be noticed that the only case which arose as a consequence of cases *a*, *b*, and *c*, developed the eruption on the 16th day after exposure.

How infection may be spread.

The question of *how small-pox may be propagated* is also a point of considerable importance. It has appeared to me to be essential in this connexion to remember the highly infectious nature of small-pox. It is strange that this feature should have been overlooked by that great clinical observer, Sydenham; but ever since the days of Boerhaave (1730) this fact has been recognised. Many instances occurred in the course of this outbreak where small-pox was contracted, although, as far as could be ascertained, the exposure to infection was very brief. Some instances occurred where the distance from the source of infection was, in all probability, considerable; such, for example, as case 60, who took some flowers to the Old Fever Hospital gate once only, 14 days before developing the eruption, but who, having great fear of the disease, did not go in. The small-pox block is 12 yards from the gate, but on the other hand she may have incurred infection from the gate-porter who habitually removed the small-pox patients.

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* Clinical Society's Transactions, Supplement to Vol. XXV. Edited for the Committee by Dr. Dawson Williams.

But cases which afford any precise information as regards the distance through the air to which infection may be transmitted simply by the exhalations from a patient were wanting in the information derived from the Warrington epidemic. Examples which help to elucidate the question are scarce, and the one given below* of an outbreak, started in much the same fashion as that at Warrington, is interesting in this connexion.

Aërial convection: limitation of inquiry.

In endeavouring to ascertain whether *spread by aërial currents* was a causal factor in the outbreak, it has seemed to me unnecessary, in view of the extremely contagious nature of the disease, to consider the question whether small-pox was, in this epidemic, propagated by the diffusion of the exhalations from a patient or patients *within* a radius of 20 yards, *i.e.*, within the radius of an ordinary hospital curtilage. The material derived from the epidemic under consideration does not lend itself to the narrower question; nor is the matter of present importance, for the spread of small-pox within the Fever Hospital was fully explained by *direct* contagion without recourse to the theory of aërial convection. But the main circumstances of the Warrington epidemic render the wider inquiry of great and practical interest, and the facts revealed are of a kind which may enable one to come to some conclusion on the subject. But in the following pages, the inquiry into the question of aërial convection will only relate to whether small-pox was or was not propagated by the spread of infection through the air beyond a distance of 20 yards (p. 69).

In the larger number of cases where small-pox was contracted during the outbreak, the disease was incurred through *direct contact*. In other instances the infection was conveyed indirectly through the *medium of a third person*, as in the cases mentioned on p. 14, or again that of a certain Mrs. S——, who nursed Case 122 for a few hours, was not attacked herself, but took the disease home to her husband. In others, it was conveyed by an *inanimate object*, as in the only case secondary to the preliminary outbreak (p. 8), who beyond doubt took the disease by removing the bedding for disinfection; or again, that of a woman named Ann H——, who washed the clothes of Case 344, and 14 days later she, her husband, and baby, all developed the eruption on the same day.

In all of these three last-named methods, the infection followed the lines of human intercourse; and there were not many cases inexplicable by direct or mediate infection, *i.e.* along the lines of human contact. Moreover, there is some evidence which, in my opinion, supports the view that small-pox was not, in this outbreak, conveyed by air currents, namely, the exemption of two such important communities as the Workhouse and Walker's Brewery from any cases which could not more reasonably be explained by direct infection. These buildings were in the near neighbourhood of the Old and New Hospitals respectively (pp. 69 and 77).

Varieties of small-pox.

The *average type*, or severity, of the cases in this epidemic has been much milder than the typical small-pox described by classical writers.† One half of the cases during the present outbreak were of a very mild kind, attended by very few or no constitutional symptoms after the appearance of the eruption. None of those latter died;

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* Dr. Sadler, Medical Officer of Health of the Barnsley Borough, narrates an instance of a delirious small-pox patient, who, on the same evening of his admission to the Kendray Hospital at Barnsley, "in a sudden and " unexpected fit of violence, overpowered the assistant nurse temporarily left in charge of him, broke out all " the glass of a large pane, and before assistance arrived had escaped through the window, without any " clothing whatever. He was at once pursued, but found his way over fields into the gardens of some houses " about half a mile away.

" It was 9 o'clock at night, he was never inside a house, and he was brought to the hospital within two hours; but a small crowd managed to collect around him, and of these, six (some of whom assured me they had never been within six or eight yards of him), took the complaint.

" Altogether in Barnsley and the adjoining township, 21 cases were traced with certainty to this man's short " escape from the hospital, and 14 others were in all probability also due to it, besides the two which had been " infected the day before he was removed." (Quoted by Dr. Arthur Whitelegge in his Annual Report to the West Riding County Council, 1893, p. 27).

† Sydenham.—Methodus Curandi Febres, Propriis Observationibus Superstructa. London, 1666, and his other works.

Rhazes.—De Variolis et Morbillis. Channing, London, 1776.

Percival.—Essays, Medical, Philosophical, and Experimental. London, 1789.

Aikin.—Philosophical Transactions, Vol. 64. London, 1774.

See also the copious bibliography in Hirsch's Handbook of Geographical and Historical Pathology. Vol. I., p. 123 *et seq.* New Syd. Society's Publication.

many had not a score of pocks upon them; and during the earlier periods of the epidemic, when the people were not on the look out for the disease, some continued at work without any hesitation, and without any evil consequences to themselves. But some of the cases were of quite a different variety, being severe and the eruption on the face confluent. The proportion of such cases was 21 per cent. among the vaccinated persons and 72 per cent. among the unvaccinated. Definitions of the three varieties of small-pox adopted—Mild, Discrete, and Confluent—will be found on p. 23.

There were numerous illustrations that a mild case may, by infection, give rise to a severe case, and *vice versâ*. Thus, severe cases gave rise to the mild cases 6a, 2, 3, 30a, &c., and the trivial case, 30a, gave rise to the severe cases 31, 57, 98, 112, of whom the last two died—showing that, however wide the variation in severity, the disease is but one clinical entity.

Protective power of previous small-pox.

It happens that Warrington offers exceptional facilities for testing the truth of the proposition that *one attack of small-pox generally confers a lifetime's immunity* from a second attack, owing to the extensive prevalence of the disease in the town and its neighbourhood during this century (p. 41). I have not seen so many pock-marked people in one place since visiting Northern Africa, and I was not surprised at the estimation that about 1·6 per cent. of the inhabitants had previously suffered from the malady. This is doubtless owing to the position of the town of Warrington on the high road to and from Manchester, Liverpool, and other large towns in the north of England, where it constitutes a half-way house for a floating population, who take such a leading part in the spread of infectious disease.

Out of the 667 cases which constituted the Warrington epidemic 0·75 per cent. had been previously attacked with small-pox.

It follows, therefore, that a previous attack does not confer absolute immunity, and, if the evidence I submit be correct, it tends to show that small-pox occurs about as frequently in persons protected by a previous attack of small-pox as it does in persons who have been vaccinated twice or oftener in their lives. The figures are not large, but much care has been taken to eliminate sources of error.

Proximate Causes of the Epidemic.

As regards *the immediate causes which lead to the outbreak*, the evidence, in my opinion, seems to show that the three leading factors in the causation of the Warrington Epidemic, 1892-3, were, in the order in which they become apparent in the narrative (Part I.), as follows:—

1. *Non-recognition* of three of the earlier cases, viz., the 2nd, 3rd, and 4th persons who developed the small-pox eruption, in August. They were seen by a doctor's assistant (alleged to be unqualified) acting in the absence of his principal. Two of them, though apparently well-marked types of small-pox, were treated at home by him as "German measles" for 10 and 7 days respectively; meanwhile the visits of friends and neighbours were unrestricted; and their relatives went to work as usual, or played daily with other children in the adjacent streets or open spaces back and front of the houses in that row. Finally the Medical Officer of Health, hearing rumours of these cases, visited them and they were promptly removed to hospital, where one of them, the unvaccinated child, æt. 10, died three days later. Three of the children of the older case contracted the disease, and altogether 23 cases resulted in their immediate neighbourhood (Narrative, p. 9). The third unrecognised case was a mild one and altogether escaped detection and isolation. This man gave the disease to his wife and an indefinite number of other persons.

2. *Deficient Hospital accommodation* for the isolation of small-pox and other infectious diseases. Sixty-four beds represent the minimum requirements of the Borough of Warrington based on the number of cases of infectious diseases needing isolation which have actually arisen and were notified in the community during the four years 1889–1892; and the total provision at the commencement of the epidemic was 30 beds for all diseases, or less than half the very lowest estimate (page 63). As a consequence of this only 13 cases of small-pox could be received into the Borough Fever Hospital by dangerously overcrowding every available space. The cases therefore, about 60 in number, which arose between August 25th and September 19th, when additional temporary hospital provision was made, were of necessity left in their own homes scattered over the town. Consequently the town became so saturated with infection, and the cases arose so rapidly that the limit of hospital accommodation, even with the additional 159 beds crowded into the temporary hospital, was, for a second time, reached

early in November, and large numbers again had to be left in their homes. In presence of such a condition of affairs it might be a matter for surprise that a no larger proportion than 1·2 per 1,000 of the population was attacked with the disease. When an almost similar state of affairs arose in Warrington in 1773, about 64 per 1,000 of the inhabitants were attacked with the small-pox.

The influence of re-vaccination.

3. *Deficiency of re-vaccination* among the inhabitants before the outbreak. My inquiries in a typical district of the town (Aikin Street area) revealed the fact that only 2·7 per cent. of the inhabitants had been re-vaccinated prior to the epidemic, and there were good reasons for believing that in the town generally this proportion was considerably smaller (p. 43).

From the evidence submitted in the following pages it is rendered highly probable that if more persons had been re-vaccinated prior to the outbreak neither of the other causal factors would have come into operation with so much power. The well re-vaccinated community of 800 persons in the garrison entirely escaped, with the exception of a militiaman who had never been re-vaccinated. These persons (men, women, and children) mixed with the towns folk and largely frequented the public-houses, amusements, and other places of public resort. If, therefore, the inhabitants generally had been similarly well re-vaccinated, it seems probable that they also would have enjoyed a somewhat similar immunity (p. 44). Again, the attack-rate amongst the re-vaccinated persons in infected houses was barely more than half the attack-rate amongst the " well-vaccinated " (p. 27). And, again, a rising outbreak amongst the workmen of the chief Iron Works in the town was suddenly checked within 14 days after the two weeks during which 1,300 or 1,400 of them were re-vaccinated (p. 44).

Finally, *recent* re-vaccination seemed, from the data obtained, to confer a remarkable immunity against the disease, for not one of all the persons attacked with small-pox during the Warrington epidemic 1892–1893 had been successfully re-vaccinated more recently than seven years prior to the epidemic (p. 43), although many, like the staff of the Fever Hospital, were specially exposed to infection. Fully one-third of the population of Warrington were re-vaccinated during the progress of the epidemic, chiefly in the month of November, and not one of all this number contracted small-pox after successful and completed re-vaccination, although, as will be seen, the whole town was pervaded with the infection, and might practically have been regarded, during November and December, as one large infected house. It may reasonably be suggested that this wholesale re-vaccination was one of the circumstances which promoted the decline of the epidemic.

In view of all these and similar circumstances revealed in the following pages, one is led to infer that deficiency of re-vaccination was a considerable factor in the causation of the Warrington epidemic; and that if the townsfolk had been as well re-vaccinated before the outbreak as they were well vaccinated, the epidemic would never have reached the dimensions which it did, in spite of the apathy of the Sanitary Authority to provide sufficient hospital accommodation, and in spite of the non-recognition of small-pox by the doctor's assistant. These latter, hospital accommodation and recognition, are really remedial measures after the small-pox has arisen, but the former, *re-vaccination*, would seem to be the true means of preventing the appearance of the disease: without it, primary vaccination, as a means of prevention, is apparently incomplete.

Influence of Primary Vaccination on the Epidemic.

Turning, in conclusion, to the subject of Primary Vaccination, it might perhaps, at first sight, be a matter of surprise that a comparatively well vaccinated town like Warrington should have been the scene of such a severe epidemic of small-pox. I estimated that nearly 99·2 per cent. of the inhabitants had been vaccinated once in their lives before the outbreak, almost without exception in infancy (p. 25). But a closer examination of the extremely potent causes in operation on this occasion, coupled with the admitted fact, as shown also in the following pages, that vaccination in infancy does not by any means confer a life-time's immunity, cannot fail to dispel the initial surprise.

A study of the facts elicited in this inquiry shows that primary vaccination exercised a very remarkable *protective power* against small-pox during the early years of life. Two hundred and seventy-two vaccinated persons under 4 years of age were exposed to contagion in the infected houses, and not one of them contracted the disease. There were 30 unvaccinated persons under this age similarly exposed and 14 of them contracted the small-pox. But Table XXXIX. (p. 54), which cost so much labour to prepare and to eliminate all possible sources of error, also shows that after the fourth year the immunity already began slightly to decline. A further decline in the immunity from attack conferred by infantile vaccination occurred in the second decade of life (p. 50), and a still further decline was noticeable in the 3rd and 4th decades. Beyond the age of 40, the confusing circumstance of the immunity of advancing years from most infectious disorders came into operation as a disturbing cause (p. 50).

As regards the power of vaccination to *modify* small-pox, this seemed, from the evidence revealed, also to be very great during the early years of life. Out of 189 vaccinated cases of small-pox under 20 years of age, only 12 were confluent cases and only three died; and inquiry showed that one of these deaths (case 117) was due to a malady quite distinct from the small-pox. The corresponding unvaccinated figures were respectively, 50 cases, 33 confluent cases, and 15 deaths. The first two decades are mentioned together in order to get larger figures for the observation. It will be seen, from the evidence submitted, that the power of primary vaccination to modify, like the power to protect, wore off as age advanced (p. 51).

A study of the age-period, attack-rate, case-severity, and the case-mortality, in the Warrington epidemic seems to show that the power of primary vaccination to modify small-pox, lasted longer by some 20 years than its power to protect from attack; for the power to *protect* was least in the third decade of life, whereas the power to *modify* was least in the fifth decade. It will be seen, however, that neither of these qualities entirely disappeared throughout life, if comparison be made between the different Warrington figures, and between the Warrington vaccinated figures, and the unvaccinated figures of other observers (pp. 50–55).

Important data as to the age when re-vaccination should be performed may be deduced from the foregoing observations.

The statistical facts and circumstances mentioned in Part II. of this Report, which are set forth with so much prolixity in order that they may be fully apparent, are the result of prolonged inquiry. It is obvious from these that there were remarkable *differences* between the attack-rate, case-mortality, age at death, and death-rate of small-pox, as it occurred amongst *unvaccinated* persons in Warrington 1892–1893, and among *vaccinated* persons in Warrington 1892–1893; and also between the disease as it occurred amongst the population of Warrington in 1773 (*unvaccinated*), and amongst the *vaccinated* persons who were attacked in Warrington in 1892–93.

It is also obvious that there are certain points of *similarity* between the disease as it arose amongst the population of Warrington in 1773, and amongst the *unvaccinated* persons who were attacked in 1892–93. These points of similarity are all the more evident, if we bear in mind that, owing to the epidemic prevalence of small-pox in the last century, almost every inhabitant who survived the early years of existence in those times, grew up protected by an attack of the disease, and thus the older decades of life were comparatively exempt.

After exhausting every possible source of information, I was unable to ascertain any adequate cause for these remarkable differences and points of similarity, excepting the circumstance that the several groups of persons were respectively vaccinated or unvaccinated; and the conclusion is irresistible that it was vaccination which afforded protection against, and modification of, small-pox in the earlier decades of life in the Warrington epidemic of 1892–3.

Cost of Epidemic.

The expenditure of the various authorities concerned, in consequence of the Warrington epidemic of 1892–3, was approximately 8,735*l.* But this sum by no means represents the cost of the epidemic to the community. To reckon that cost it is necessary to add to this 8,735*l.*, the cost to employers of providing re-vaccination to their workpeople, the amount of the loss of wages of those who contracted small-pox and of their friends at the time of quarantine, the amount of the funeral expenses of those who died and of their value as wage-earners, the cost to the parish and other authorities of those rendered destitute, and the amount of the damage done to the trade of the town. I have, on page 19, attempted to estimate these items; and I find that the cost of the epidemic to the community could not have been less than 22,000*l.*

It will, I think, be rendered evident from a perusal of the following pages that if adequate hospital provision had been made in a properly situated building, and if re-vaccination had been regularly carried out, and the two maintained in an efficient state, then this great cost and the many other, and even more serious, consequences of the epidemic, which cannot find monetary expression, might have been avoided. The proper way to regard all sanitary outlay is as an insurance; and a consideration of these figures may well suggest the reflection whether any investment is calculated to yield a better pecuniary return to a community than the expenditure involved in the operations of a Public Health Department which have for their main object the prevention of such epidemics.

PART I.—Narrative of the Small-pox Epidemic in Warrington, 1892–3; the Steps taken by the Local Authorities to cope with it; and the Cost of the Epidemic.

LEADING FACTS CONCERNING WARRINGTON.

(Dealt with more fully in Part IV.)

Situation. The town of Warrington is situated in South Lancashire, about half way on the high road from Liverpool to Manchester. The country around is flat and low-lying, and the town is built on the north bank of the River Mersey. (Map at end.)

Population. Estimated population, Midsummer 1892, } 54,084.*

The population consists almost entirely of the artisan and labouring classes, employed largely in the manufacture of iron.

Density. *Inhabited* houses, 1892 (estimated), 10,025. Area, 1,968 acres. Average density of population, 5 persons per acre, but in some places (St. John's Ward) 66·8 persons per acre.

Birth rate, 39·9; death rate, 22·7; for the year ended December 31st, 1892.*

Notification since July 1879. Warrington was one of the earliest towns to adopt compulsory notification of infectious diseases, by its insertion in the "Warrington Corporation Lighting and Improvements Act, 1879" (secs. 23, 24, and 25), which came into force in July 1879.

Sanitary Authority. The Corporation, acting by the Council of the borough, is the Urban Sanitary Authority for the borough, with the powers and obligations of an Urban Sanitary Authority.

Vaccination. Vaccination in the Warrington Union, which is not co-terminous with the borough, is, as usual, under the control of the guardians. The medical officer of health and public analyst of the Borough (Mr. John H. Gornall) is also public vaccinator to the Union.

In 1892, it may be estimated that 99·2 per cent. of the inhabitants had been vaccinated in infancy. Only 2·7 per cent. were found to have been re-vaccinated in a typical district of the town prior to August 1892. (Vaccination will be dealt with in detail in Part II. of this Report.)

Hospital provision. The certified accommodation of the borough fever hospital (Aikin Street) for all classes of infectious disease in 1881† was 28 beds (two pavilions, each for 12 beds, and one special building, four beds), all giving a cubic space of a little over 2,000 cubic feet per bed. In 1888 a Dœcker hut was erected, having a cubic space of 3,600 cubic feet, presumably for two patients. The total accommodation for infectious diseases amounted, therefore, at that time to 30 beds.*

At the date of the epidemic (May 1892) no increase had been made, and the provision for all classes of infectious cases was still 30 beds, as compared with an actual requirement of 64 beds, based on the actual needs of the borough (see p. 63).

Power to acquire land for extension of the infectious diseases hospital within two years after the passing of the Act, was provided for by section 84 of the Warrington Extension and Water Act, 1890 (August 14th).

Epidemic of Scarlatina Concurrent.

Scarlet fever epidemic. Scarlet fever is endemic in Warrington, and an exacerbation of the disease was running concurrently with the small-pox epidemic. Altogether 510 cases were notified during the year 1892, and the medical officer of health informed me that the average number of scarlet fever patients in the hospital during the six months ending December 1892 was between 70 and 80,† (see also p. 62.)

The average annual death-rate from scarlet fever in Warrington for the 10 years prior to compulsory notification (1879, 0·7) was 1·22 per 1,000 of the population. The average death-rate for 10 years after that time (1879–1888) was 0·49 per 1,000 of the population, a reduction of 0·7 per thousand in the mean annual mortality of this disease since compulsory notification was introduced.

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* Report of medical officer of health for 1892.

† Dr. Thorne Thorne. Report of Medical Officer to the Local Government Board, on the use and influence of infectious hospitals, 1882, p. 273.

* A further description of the hospital will be found on p. 61.

† The following are the monthly admissions of scarlet fever cases to hospital:—50 in July, 48 in August, 58 in September 57 in October 28 in November, and 13 in December 1892.

Explanatory and Summary of Cases.

Explanatory.

The period of time dealt with is from May 10, 1892, when the first case occurred, to May 10, 1893, when the outbreak was apparently fading away.§

The dates in the following narrative have reference always to the appearance of the eruption, as being the most fixed and definite symptom of the disease, and one which is, generally, the starting point for prompt measures in dealing with that particular case. On the appearance of the eruption the patient's friends, however ignorant, know that something has happened, and the day of its occurrence is rarely forgotten by them. The doctor is probably then able to declare the nature of the disease; and then also the responsible authority is enabled to adopt means for the prevention of its spread.

In the following narrative of the epidemic the action taken by the local sanitary authority will be interpolated between the successive groups of cases and indicated by smaller type. A chronological order is adopted throughout.

The cases of small-pox have been numbered in order of notification, which does not, necessarily, correspond with order of date of attack. Those followed by a small "a" are unnotified cases.

Groups.

The wave-like occurrence of cases, characteristic of epidemic infectious diseases, was well marked in this outbreak. At first there were intervals between the waves, when no cases occurred; gradually these intervals shortened, and later on they disappeared. Towards the end they returned, and the waves became gradually lower. (Chart opposite.)

Thus do the cases divide themselves into groups, or batches, and it will be both scientific and convenient to deal with them in periods of time, in the natural groups thus formed.

Group A.	(May 10th to June 1st) - -	4 cases.
Group I.	(July 26th) - - - -	1 case.
Group II.	(August 16th to August 23rd) -	15 cases.
Group III.	(August 30th to September 13th) -	50 cases.
Group IV.	(September 18th to November 12th)	308 cases.
Group V.	(November 13th to December 10th)	102 cases.
Group VI.	(December 11th to May 10th) -	187 cases.
	Total May 10th, 1892, to May 10th, 1893,	667 cases.

Summary of cases.

Altogether 667 cases* are known to have occurred between May 10th, 1892, and May 10th, 1893, in a population of 54,084. Thus, 1·233 per cent. of the inhabitants of all ages were attacked. Of these 667 cases, 329, or *49* per cent., were mild or modified; 160, or *24* per cent., were discrete; 178, or *27* per cent., were confluent, malignant, or hæmorrhagic; and 62, or *9* per cent., died.

The different types of the disease are defined on p. 23.

The accompanying chart shows in a graphic manner the weekly occurrence of cases and the different types during the whole year, May 10, 1892–93. Here also is a table (Table I.) showing the proportions of the different types and the case-mortality during different months of that year.

Table I.

Showing the Number of Cases, and the proportion of each type which occurred during successive periods of the year, May 10th, 1892–May 10th, 1893§ :—

——	Total No. of Cases.	Fatal Cases.		Con-fluent.		Discrete.		Mild.	
		No. of Cases.	Per-centages.	No. of Cases.	Per-centages.	No. of Cases.	Per-centages.	No. of Cases.	Per-centages.
May 10th to July 26th 1892.	5	1	*20*	1	*20*	3	*60*	1	*20*
Four weeks ending Sept. 10th, 1892.	56	4	*7*	13	*23*	12	*22*	31	*55*
Four weeks ending Oct. 8th, 1892.	104	8	*7*	25	*24*	29	*28*	50	*48*
Four weeks ending Nov. 5th, 1892.	125	16	*13*	39	*31*	23	*18*	63	*51*
Four weeks ending Dec. 3rd, 1892.	169	18	*10*	48	*28*	28	*17*	93	*55*
Four weeks ending Dec. 31st, 1892.	44	7	*16*	14	*32*	14	*34*	16	*34*
Four weeks ending Jan. 28th, 1893.	37	0	*0*	6	*16*	15	*43*	16	*41*
Four weeks ending Feb. 25th, 1893.	29	4	*14*	7	*25*	8	*27*	14	*48*
Four weeks ending March 25th, 1893.	29	1	*1*	6	*21*	9	*31*	11	*48*
Four weeks ending April 22nd, 1893.	49	1	*1*	12	*25*	13	*28*	24	*47*
Three weeks ending May 10th, 1893.	20	2	*10*	7	*35*	6	*30*	7	*35*
	667	62†	*9*	178	*27*	160	*24*	329	*49*

Note.—The dates refer to the cases which developed the eruption during that period, and the proportion of the deaths and different types among the cases which *arose* during that period.

Thus it will be seen that the *fatality* was higher in the middle (December) than at either end (with the remarkable exception of January); and that it was higher at the beginning than at the end of the epidemic.

The *severity* of attack was also greater in the middle (December) than at either end. But it differs from the fatality in being rather higher at the end than at the beginning of the epidemic.

Narrative.

Preliminary Localised Outbreak in May, 1892.

Group A.

(May 10th to June 1st.)—4 cases.

May 10th, 1892.

At the little village of Clifton, near Brighouse, Yorkshire, in April 1892, one of the farm hands was laid up with what his doctor called "measles," but which by its effects was proved to be small-pox. He stopped at home for a few days, and then went about as usual. Shortly after this, the farmer (Case A.) and his family removed to Latchford, 2 miles out of Warrington, and a day or two after their arrival, he, the farmer (Case A.), his daughter (Case B.), and son (Case C.), all developed the rash of small-pox.

Notification was not compulsory in the rural sanitary district around Warrington,† and no provision was made for the isolation of small-pox cases; but after five days' delay (May 10th–15th) arrangements were made between the Rural and Urban Sanitary Authorities for their reception into the Borough Fever Hospital in the town of Warrington (May 15th). The only member of the family who escaped the disease was the farmer's wife, whose vaccination marks are inferior to those of any of the others.

These people, being newly arrived, *had no friends in or around Warrington*, and, though there was a delay in their removal, they were carefully quarantined and confined to their house. The house itself is almost surrounded by fields, and the only member of the family (the mother) who escaped infection went into hospital with the patients.

Their house and its contents were promptly disinfected, and the only case which resulted was one of the two men (Case D.) employed by the Corporation to effect the disinfection. He had not been re-vaccinated, and developed the rash of small-pox 16 days later (June 1st). *No other than these four cases occurred for nearly two months afterwards.*

Action of Local Authorities. May 18th, 1892.

On May 18th, 1892, the medical officer of health in his report to the sanitary authority urged, for a second time, the advisability of providing fever hospital accommodation in a more suitable position, as follows:—

> "Up to the present time we have been able to cope with introduced cases notified from the borough, but, as I pointed out in February 1889, there is very great danger in treating small-pox cases in close proximity with a populous neighbourhood as Aikin Street is, and two full wards of scarlet fever in our own grounds.

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* Excluding cases proved not to be small-pox and including unnotified cases.

† Notification was subsequently adopted by the Rural Sanitary Authority October 1st, 1892.

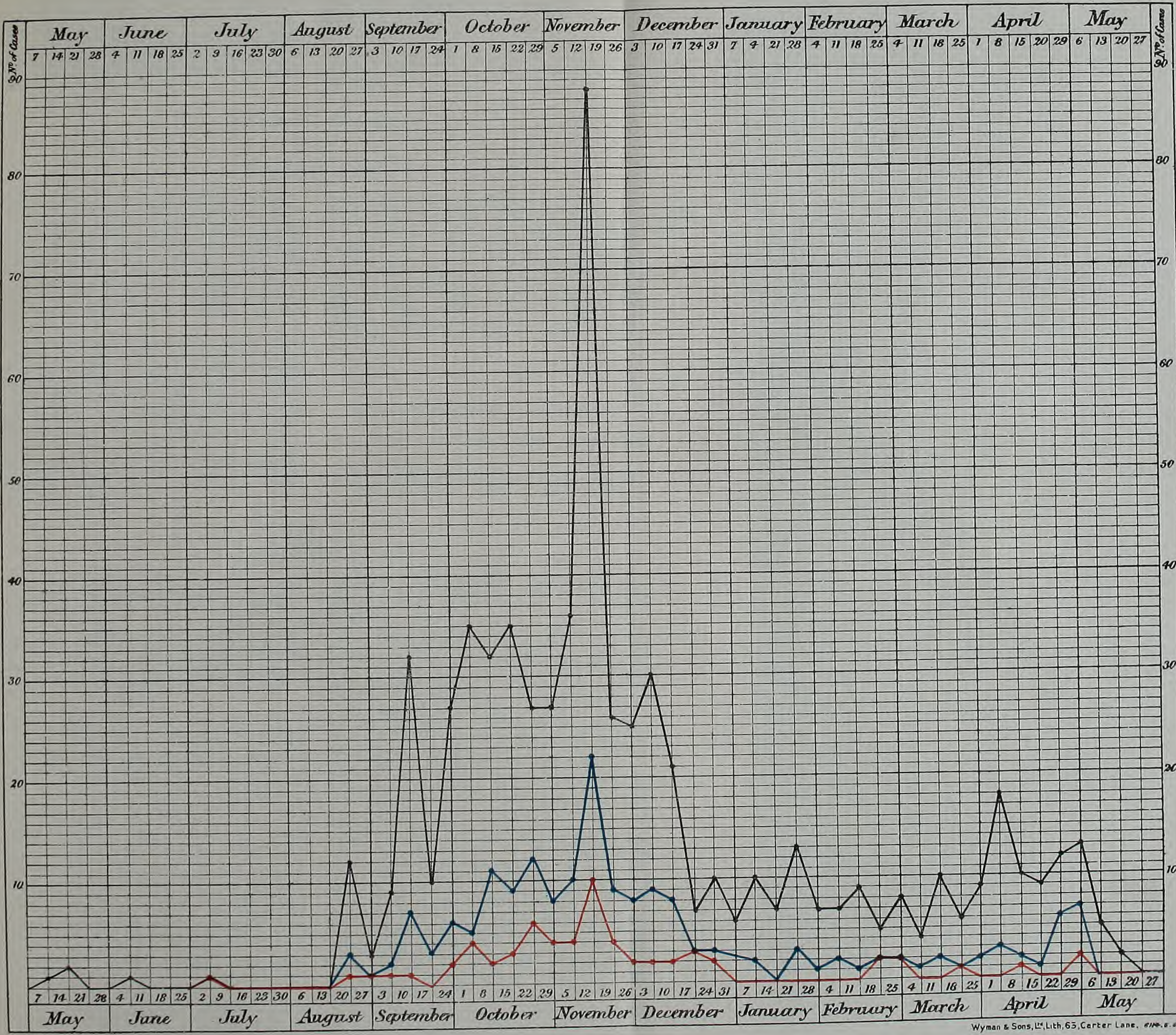
§ Since May 10th, 1893, up to the present time (December 1893), 24 cases have been notified as follows:—11 in May, 10 in June, 3 in July. None have been notified since July 24th, and the temporary hospital was closed on August 29th, 1893.

† This includes 4 vaccinated persons, whose proximate causes of death were, respectively: inflammation of lungs (607), pyæmia (117), nephritis (204), and phthisis (473); the small-pox being in them only a contributory cause of death.

CHART SHOWING THE NUMBER OF PERSONS WHO DEVELOPED THE ERUPTION OF SMALL-POX EACH WEEK ENDING WITH THE DATES GIVEN; THEIR TYPE, AND THE NUMBER OF THEM WHO SUBSEQUENTLY DIED. 10TH MAY 1892 TO 10TH MAY 1893.

MAY 1892.

MAY 1893.



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To face page 8.

Explanation

Black = *weekly number of persons who developed rash:*

Blue = *weekly no. of confluent cases.*

Red - *weekly number of deaths*

"The experience gained by the Sheffield epidemic points to the fact that hospital accommodation, designed for the reception of small-pox, requires a much larger space about it than sites for other infectious diseases.

"It is nothing unusual for small-pox hospitals to disseminate the disease, and we run a considerable amount of risk in treating small-pox in the small ward (originally intended for the treatment of typhoid) near the administrative department, past which tradesmen and others are constantly passing, in addition to the nearness of adjoining streets and our own wards."

June 7th, 1892.

After having had the matter under consideration for some time the Town Council decided on June 7th to take preliminary steps for negotiation, with a view to purchase an acre of ground beside the old fever hospital (Aikin Street), as the time limit (2 years) provided in the Warrington Extension and Water Act, 1890, would shortly expire.

July 16th, 1892.

On July 16th the medical officer of health again, a third time, urged the desirability of more suitable provision for small-pox, and also called attention to the inadequate accommodation for scarlet fever.

The General Outbreak.

Group I.

(July 26th.)—1 case.

Original case. July 26th, 1892.

After an interval of nearly two months a navvy (W. R——, Case 1), residing at a common lodging-house in the centre of the town, was taken ill and kept to his bed. He developed a rash on July 26th, 1892. Two days later the owner of the lodging-house noticing the man, and not liking the appearance of the blotches on his face, boldly walked with him through some of the principal streets to a doctor, and thence to the Borough Fever Hospital. He was admitted (July 28th) and placed in the Dœcker tent, where he died eight days later (Aug. 5th). He had never been vaccinated.

Source of Infection.

The source of infection of this case is obscure. He was a labourer on the Manchester Ship Canal, two miles out of Warrington, not far from the house where the preliminary outbreak occurred in May. He came in each evening to the lodging-house. The owner of the lodging-house states that he had been residing there continuously for four weeks. Probably he incurred the disease from the ever-shifting population amongst whom he lived and worked.

The lodging-house was disinfected, and other precautions taken, and only one person (Case 4, whose rash appeared about August 17th), *so far as is known*, subsequently developed the disease among the 70 other inmates of this house, chiefly vagrants.

Patient's escape. July 30th 1892.

Case 1 was a severe confluent one, and in his delirium he escaped from the hospital between 1 and 2 o'clock on Saturday morning, July 30th. The patient was at large in the town for some six or seven hours. Careful investigation has failed to discover exactly all he did during that time. He escaped by the main gate of the hospital, which he left open; visited the market, which is very busy on Saturday morning; was apprehended by a constable in Winwick Street, two-thirds of a mile away, and was conducted by him back to the hospital on foot about 8 a.m. through some of the busiest thoroughfares, where he probably came in contact with many foot passengers.

Consequences.

The consequences of this case appear to have been:—

1. Spread within the Borough Fever Hospital (p. 11).
2. Infection of, and spread within, the workhouse (p. 12).
3. Twelve other cases in different parts of the town, forming Group II. These will now be described.

Group II.

(August 16–23.)—15 cases.

A.—Details of the Individual Cases.

An interval of nearly three weeks separated the eruption of the first case from those of the second group of cases.

The 15 cases forming this group will merit careful individual study, and will be taken nearly *in the order in which they developed the eruption*. The numbers of the cases only indicate order of notification; the letter *a* after the number signifies that the case was unnotified. The positions of these cases may be seen in Map I.

August 16th.

Case 13.—Elizabeth S——, æt. 36, a vaccinated but not a re-vaccinated person, living in Howard Street, near the Old Fever Hospital, the mother in a household of 10, after ailing a few days, developed the rash of discrete small-pox on August 16th. Next day she sent for her doctor. Unfortunately, the doctor was away for a holiday, but *the assistant left in charge, who was alleged to be unqualified, called, and pronouncing the case to be " German measles," (although the spots are reported to have had " white heads to them,") treated the case at home as such for* 10 *days.* On August 25th the medical officer of health, hearing rumours of the case, visited her, and she was removed next day (August 26th) to hospital. But during that 10 days the visits of friends and neighbours were unrestricted; her husband and son went to work, and her seven other children were playing daily (for it was fine weather) with others in the open spaces, back and front, of the houses in that row. Three of her own well-vaccinated children (aged 14, 12, and 9) subsequently contracted the disease; and altogether, 23 cases* developed the eruption between August 30th and September 12th,† in the houses around the open spaces in front and rear of this house, and that of case 10.

Aërial spread.

These two open spaces lie within 150 yards radius of two supposed centres for the aërial spread of small-pox, the Borough Fever Hospital and the Workhouse, situated side by side, and in both of which small-pox patients were being collected. But it is a fashion among the artisan classes at Warrington for neighbours to spend much time in each other's houses, and for their children to play amidst the dirt of such open spaces (known as fields) as may be near (such as may be seen in photo. 3, p. 68), especially during the month of August, when the weather encourages outdoor life. Just such an open space is seen in photograph ——, beside the New Hospital to be spoken of hereafter.

August 17th.

Case 10.—Henry B——, æt. 10, living in the same street as the foregoing, was taken ill on the 14th, and developed the characteristic rash on August 17th. The same " doctor's assistant " as in the preceding case was at once sent for, and saw the boy. This time also the case was designated " German measles." The child was unvaccinated, and the case a severe confluent one, but it was not until the 23rd (on the seventh day of the rash) that it was recognised and removed to hospital, where the little boy died three days later. Meanwhile friends and neighbours visited the house freely, and the father, æt. 37, worked all the time at the Dallam and Bewsey forge, which takes so prominent a position in the future history of the epidemic. The father himself developed the rash 14 days after his son (although he was reported to have had small-pox 33 years before); and the barber, whom the " doctor " ordered to cut the hair, also took the disease. Three brothers and sisters, and the child's mother, all well vaccinated, escaped. Twenty-three cases resulted, as just mentioned, in the immediate neighbourhood of these two cases; and altogether 30 out of the 50 cases forming the next batch arose in this, the Whitecross, ward.

August 17th.

Case 6*a*.—Heywood H——, æt. 31, living in an adjacent street, a labourer at Richmond's gas stove works, developed a few spots on August 17th. He also was seen by the same " doctor's assistant " who attended the two foregoing cases. This case was a mild one, and entirely escaped detection or notification. The disease appeared in the wife 15 days afterwards (*Case* 17).

August 17th.

Case 6.—Mary T——, æt. 21, a dressmaker, developed the rash on August 17th. The case was a mild one, and the illness not regarded by the friends as sufficiently serious to need a doctor, until the 20th, when she was seen and promptly removed and isolated. This girl was at home four days with the eruption out. Unfortunately her aunt, with whom she lived, kept a small general provision store in a very populous part of the town; which, being a popular place of resort for the neighbouring housewives and workhouse inmates, was calculated to be a fruitful source of infection. Two weeks later, her aunt and her brother developed the rash in this same house.

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* Nos. 52, 19, 20, 26, 21, 18, 23, 25, 28, 69, 27, 29, 34, 35, 42, 54, 24, 56, 53, 62, 16, 22, 17.

† 14 and 17 days after August 16th and August 26th respectively.

August 18*th.* *Cases Nos.* 2 *and* 3.—Hettie L——, æt. 9, and Alice M——, æt. 25, developed the eruption on August 18th. They were, respectively, a scarlet fever patient and the kitchenmaid in the Old Borough Fever Hospital, and I am informed that they were therein isolated. Altogether 11 persons incurred infection within the Borough Fever Hospital—two officers, and nine scarlet fever patients (*see* p. 11).

August 18*th.* *Case* 7.—Richard D——, æt. 37, Liverpool Road, developed the eruption August 18th. The case was a confluent one, but it was mistaken by his doctor for scarlet fever, and notified as such until the 21st, when it was re-notified and removed. Unisolated for four days.

August 18*th.* *Case* 8.—Emanuel C——, æt. 16, an ironworker at the Bewsey Forge, living at Guardian Street, a mild case, developed the rash on August 18th. The illness was too trivial, he and his friends thought, to seek medical assistance until the 21st, when he was seen by a doctor, notified, and removed same day. At home four days with rash out.

August 18*th.* *Case* 9.—Mary B——, æt. 29, Haydock Street, was a confluent case. Rash appeared August 18th, but was not recognised by her doctor until the 23rd. At home six days with eruption out.

August 19*th.* *Case* 4.—David W——, æt. 34, a navvy, residing at the same lodging-house as the first case (Case 1), walked up by himself to the hospital with discrete small-pox out upon him on August 19th. The disease was there recognised and the patient admitted. The exact date when his eruption appeared is unknown; probably, the assistant medical officer of health thinks, about the 17th. He worked at some gasworks in the northern part of the town, but whether he attended there after the rash appeared is doubtful.

August 19*th.* *Case* 5.—Josiah A——, æt. 4, a mild case, developed the rash on August 19th. He was at the time an occupant of the girls' school in the workhouse adjacent to the fever hospital. A discussion thereupon ensued between the guardians and the borough sanitary authority as to whether the former ought to provide separate fever and small-pox accommodation for paupers. Meantime the case remained in the workhouse. Subsequently five cases arose in the workhouse by spread from this case (Nos. 44, 45, 56, 146, 213) (*see* p. 12).

August 20*th.* *Case* 30*a*.—Agnes M——, æt 21, a servant at a much frequented public-house in Green Street, was a very mild case, and was never seen by a doctor at all. After ailing a few days, she developed one or two spots on August 20th, and was sent home a day or two later, to her mother, living in Cockhedge, a distant part of the town, where her sister developed the disease two weeks later, and several friends and relatives took the disease. Like Case 6 (Mary T——), this young woman lived at a popular place of resort. This case was never isolated at all.

August 22*nd.* *Case* 12.—Jno. A——, æt. 31, Winwick Road, a severe confluent case, developed the eruption on August 22nd. The same "doctor's assistant," who attended the first three cases, declared this case not to be small-pox, but the mother, thinking otherwise, sent for another doctor, and the case was removed on the 24th. He died on the 30th. At home with the eruption out for three days.

August 23*rd.* *Case* 11.—William B——, æt. 26, an ironworker at Dallam Forge, living in Winwick Street, developed the rash on August 23rd. The case was a mild one, but promptly recognised, and removed to hospital on August 24th.

August 23*rd.* *Case* 15.—Thomas J——, æt. 44, Percy Street, brother of the landlord of the public-house where case 30*a* (*ante*) served, developed the eruption on August 23rd. The case, a discrete one, was seen by a doctor on the 24th, and notified on the 25th.

But, unfortunately, the Borough Fever Hospital, where it was never possible to receive more than 13 cases at one time, was now quite full, and this man was, therefore, left at home altogether. This overcrowding of the Hospital was itself a source of danger to the inmates, as will be seen directly.

Table II.

Giving some Particulars of the 15 Cases forming Group II.

Case No. and Book Reference.	Name.	Age.	Address and District of Town.	Date of Rash.	Days Unisolated with the Rash out.	Type of Case.	Result (Recovery or Death).	Cause of delayed Removal to Hospital.	No. of other Cases which occurred in the same House as a Consequence.
13 $\frac{\text{VI.}}{15}$	S——, Elizabeth	36	Howard Street -	Aug. 16th	Eleven days -	Disc. -	R.	Non-recognition by doctor's assistant.	3
10 $\frac{\text{VI.}}{6}$	B——, Henry -	10	Howard Street -	Aug. 17th	Seven days -	Confl. -	D.	Non-recognition by doctor's assistant.	1
6*a* $\frac{\text{V.}}{2}$	H——, Haywood	31	Guardian Street -	Aug. 17th	Unnotified, never isolated.	Mild -	R.	Non-recognition by doctor's assistant.	1
6 $\frac{\text{V.}}{20}$	T——, Mary -	21	Priestly Street -	Aug. 17th	Four days - -	Mild -	R.	Did not send for doctor -	2
2 $\frac{\text{IV.}}{1}$	M——, Alice -	25	Kitchen-maid, Borough Fever Hospital.	Aug. 18th	0 days - -	Mild -	R.	In fever hospital - -	8 or 9
3 $\frac{\text{IV.}}{1}$	L——, Hettie	9	Borough Fever Hospital.	Aug. 18th	0 days - -	Mild -	R.	In fever hospital - -	
7 $\frac{\text{VII.}}{1}$	D——, Richard -	37	Liverpool Road -	Aug. 18th	Four days - -	Confl. -	R.	Mistaken by doctor for scarlet fever.	0
8 $\frac{\text{V.}}{1}$	C——, Emanuel	16	Guardian Street -	Aug. 18th	Four days - -	Mild -	R.	Did not send for a doctor -	0
9 $\frac{\text{VIII.}}{4}$	B——, Mary -	29	Haydock Street -	Aug. 18th	Six days - -	Confl. -	R.	Non-recognition by doctor	0
4 $\frac{\text{III.}}{1}$	W——, David -	36	A lodging-house on Friars Green whence R—— (Case 1) came.	Aug. 19th or 17th.	Unknown - -	Disc. -	R.	Walked up to hospital -	*Unknown.
5 $\frac{\text{V.}}{4}$	A——, Josiah -	4	Workhouse -	Aug. 19th	Never removed from workhouse.	Mild -	R.	Discussion between Guardians and Corporation.	5
30*a* $\frac{\text{VII.}}{11}$	M——, Agnes -	21	Green Street -	Aug. 20th	Never isolated -	Mild -	R.	Never seen by a doctor at all.	1
12 $\frac{\text{XI.}}{1}$	A——, John -	31	Winwick Road -	Aug. 22nd	Three days -	Confl. -	D.	Non-recognition by doctor's assistant.	0
11 $\frac{\text{II.}}{20}$	B——, William -	26	Winwick Street -	Aug. 23rd	Removed next day	Mild. -	R.	Not seen by a doctor before.	0
15 $\frac{\text{XII.}}{7}$	J——, Thomas -	44	Percy Street -	Aug. 23rd	Never removed to hospital.	Disc. -	R.	No room for reception into hospital.	0

* 70 or more vagrants and labourers shifting from day to day resided here.

Remarks on Table II.

Length of delay.

From Table II. it will be seen that, if we exclude the two cases which occurred within the Borough Fever Hospital, there were only two out of the remaining 13 which were promptly recognised and removed. Of the remaining 11:—

1 case remained at home 10 days with the rash out.
1 ,, ,, 7 ,, ,,
1 ,, ,, 6 ,, ,,
3 cases ,, ,, 4 ,, ,,
1 case ,, ,, 3 ,, ,,
and four cases were never removed to hospital at all.

Cause of delay.

As regards the cause of delay in removal it will be observed that in four cases the patient or his friends did not consult a doctor immediately (Cases 6, 8, 4, 30*a*), and one of these was never seen or notified at all. Three of them were very mild cases, and the infections resulting from them were not, comparatively speaking, very numerous.

Four cases were seen and not recognised by the "doctor's assistant," acting in the absence of his principal (Cases 13, 10, 6*a*, 12), and one of these was never notified.

Two other cases were not recognised by their doctor;
Two cases were already in the Fever Hospital;
One was left in the workhouse; and
One had to be left at home because the hospital was full.

In all the cases removal was very prompt after notification, excepting in the last-named case.

B.—Source of Infection of 15 cases in Group II. (August 16–23.)

August 16th–23rd.

We have seen that the first case (R——) was for a long while the only known case in the town, that he was walked up to the hospital on July 28th, that he escaped on the 30th, and died on August 5th.

Now, the circumstances that all the cases of Group II. developed the disease within a few days of each other, and that this group was preceded and followed by quiet intervals without cases, render a common source of infection highly probable. And as R—— was the only known source at this time, it seems highly probable that he was, *directly or indirectly*, the cause of them all. Moreover, there are certain other facts which render it still more probable that he was the source.

1. The appearance of the eruption in all the cases in Group II. took place between 17 days after his escape from hospital, and 16 days after his death.

2. His excursion from the hospital must have brought him into direct contact with a large number of people, and although some of the cases of this group were scattered over the town, they all lived along, or adjacent to, the routes he is known to have traversed.

3. Even after death, R—— is accredited with spreading infection, for it was alleged that five of these cases contracted the disease from a man, who after assisting at his burial on August 5th spent the evening at an inn in the vicinity of Old Borough Hospital. One of these five was a servant there, and the other four were known to be regular frequenters of this inn.

But one of the officials of the hospital (the hospital keeper) was also a frequent visitor at this inn; and since the rash in these five cases appeared respectively on the 17th (H——), 18th (D——), 18th (C——), 20th (M——), 23rd (J——), of August, it seems less probable that they all took infection on the same day than on different occasions.

The incubation of the cases in this group may be thought long (as in Case D., p. 8), but 14 of these 15 early cases had ample opportunity of incurring infection, either directly from Case 1, or *through the mediation of a third person or object*.

It is of course possible that there existed other undiscovered cases as sources of infection to some of these 15, but no evidence of their existence was obtainable.

How the disease arose in the hospital (where two of these 15 early cases occurred), and the workhouse (where one occurred), and how it spread therein, will now be considered.

C.—Spread of Small-pox within the Old Borough Fever Hospital, Aikin Street.

Original case. July 28th.

How the disease spread here was a little difficult to investigate at the time I commenced this inquiry, December 1892, but the following facts are worthy of attention:—

R——, the navvy (Case 1), on his admission (July 28th) to the hospital, was placed in the Dœcker tent (marked k on plan, p. 61), where he died on August 5th. He was attended by a nurse who slept in the same structure, and subsequently, after his escape on July 30th, by a male attendant at night; both of whom gave evidence that he was delirious most of the time.

The persons who contracted the disease within the hospital were a kitchenmaid, a nurse in charge of the small-pox cases, and eight or nine scarlet fever patients; 10 or 11 persons in all (*vide* Table III. at foot of next page).

Position of cases and source of infection. August 18th.

The first person to contract the disease within the hospital was the kitchenmaid, Case 2 (who had not been re-vaccinated), who daily fetched and cleansed the plates and dishes used in the Dœcker tent. It was quite obvious that this and the next case took the disease from R——, Case 1.

On the same day a little scarlet fever patient, Case 3, who had been up and about, developed the disease. She was sleeping in the *acute* scarlet fever pavilion (a.a., hospital plan, p. 61) at that time, but soon after the appearance of the rash the child was *moved*, probably on account of the crowded state of the hospital, *over to the nurse's "duty room" in the centre of the* convalescent *scarlet fever pavilion (b.b.) opposite, in which all the cases but two subsequently arose.*

Cases which arose in pavilion a.a.

Only two cases (Cases 207 and 227*a*) subsequently occurred in pavilion a.a. Case 207 was a scarlet fever patient up and about. She may have contracted the disease either indirectly from Case 3, or from two young women suffering from small-pox, who were sent up by a doctor to the hospital as cases of scarlet fever, and taken straight into that pavilion; for there was no receiving or quarantine ward where patients could be placed pending the arrival of the medical officer of health. Or, again, she may have contracted it from Case 111, or Case 2.

Case 227*a* was a child who developed the rash on the 14th day in hospital. She was alleged to have incurred infection from the ambulance during removal to hospital, while suffering from scarletina.

Cases in pavilion b.b.

The remaining seven cases, which included the nurse of the pavilion b.b., arose among the patients in pavilion b.b. in succession, after Case 3 was sent over to the "duty room" there, and they were evidently traceable to that origin. Cases 55*a* and 60*a* were treated along with Case 3 in the nurses' duty room in the centre of that pavilion (b.b.) The later cases as they arose here were sent over to the "typhoid block" (c.c.), which was now being used temporarily for small-pox cases from outside.

It seems clear that R—— was a source of direct contagion to Cases 2 and 3; that Case 3 was a source of direct contagion to seven others in pavilion b.b., as represented in the annexed diagram. (Diagram I.)

Vaccinated condition.

It did not appear that the scarlet fever patients in hospital were re-vaccinated at the time of the outbreak of small-pox. The nine scarlet fever patients who contracted small-pox had never been vaccinated since infancy. Two of them were unvaccinated, and of these one died.

It was stated that all the Borough Fever Hospital staff were re-vaccinated in May, 1892, but the two above mentioned (viz., kitchen-maid, 2, and nurse, 111) had not been re-vaccinated.* They are stated to have joined after that date.

Proportion attacked.

The number of scarlet fever patients in hospital in August was about 75; the number admitted during September was 58, October 57, November 28; the officials numbered about 14; so that the number of persons exposed within the hospital during this time was 232 (chiefly children), of whom 11, or 4·7 per cent., took small-pox.

This does not include the two persons mentioned in the note at foot of Table III.

Causes of spread in hospital.

The proximate cause of the spread of small-pox within the Borough Fever (or Isolation) Hospital, Aikin Street, was undoubtedly insufficient isolation of R——, (Case 1), and of the other cases as they arose.

The task of isolation was rendered extremely difficult by reason of the insufficient accommodation provided by the Sanitary Authority, and the consequent overcrowding among the scarlet fever patients. This was the real source of all the mischief; but there are three other, contributory, causes,—

---

* The nurse subsequently stated that she was re-vaccinated a few days before the eruption.

1. When the matron of a hospital is the chief resident official of a hospital, it is very desirable that she should be possessed of exceptional qualities for the post. I was informed that none of the nursing staff had had any previous hospital training or experience prior to their appointment at the Aikin Street Hospital. Though at the time of the outbreak the matron had held the post for five years previously.

2. The fact of there being no quarantine or receiving ward where patients could wait pending the arrival of the doctor, and pending diagnosis, is certainly a very serious defect in an isolation hospital. Two instances have been mentioned of the consequences arising therefrom.

3. In dealing with contributory causes some authorities would urge‡ that re-vaccination of all the scarlet fever patients and inspection of the entire staff at this time would have been a reasonable precaution.

The foregoing narrative sufficiently explains the serious spread of small-pox within the Fever Hospital without the intervention of the hypothesis of aërial convection (p. 66).

D.—Origin and Spread of Small-pox in the Warrington Workhouse.

The workhouse, like the hospital, was early invaded by the disease, and being only separated from the latter by a high wall, the incident possesses some interest.

The first person attacked was a little boy, Josiah A——, æt. 4 (Case 5), a permanent inmate of the girls' school, situated in a part of the building adjacent to, and only 120

Original case. August 19th

TABLE III.

PARTICULARS of 11 CASES, forming part of Groups II., III., and IV., arising among the Inmates of the Old Borough Fever Hospital.

Case No. and Book Reference	Name of Patient.	Sex.	Age.	Admission to Hospital.	Date of Rash.	Position in Hospital at Time of Infection.	Primary Vaccination.				Re-vaccination.
							Date.	Marks.			
								No.	Character.	Area.	
2 $\frac{\text{IV.}}{1}$	M——, Alice	F.	25	Kitchenmaid in hospital since May.	Aug. 18th	Administrative block	Infancy	2	W. fov.	II.	Never.
3 $\frac{\text{IV.}}{1}$	L——, Hettie*	F.	9	Aug. 2nd	Aug. 18th	Acute scarlet fever pavilion (a.a.), then put over in duty room of pavilion (b.b.).*	Infancy	1	Fov. cic.	III.	Never.
55*a* $\frac{\text{IV.}}{23}$	J——, Ada	F.	9	Aug. 12th	About Sept. 12th.	Convalescent scarlet fever pavilion (b.b.).	Infancy	1	Fov.	III.	Never.
60*a* $\frac{\text{IV.}}{24}$	O'D——, Jimmy	M.	10	Aug. 22nd	About Sept. 12th.	Convalescent scarlet fever pavilion (b.b.).	Infancy	3	Fov.	III.	Never.
111 $\frac{\text{IV.}}{1}$	R——, Mary	F.	24	Nurse in hospital.	Sept. 30th	On duty in convalescent scarlet fever pavilion (b.b.).	Infancy	1	Fov.	I.	A day or two before the eruption.
207 $\frac{\text{IV.}}{2}$	K——, Mary*	F.	25	Sept. 28th	Oct. 17th	Acute scarlet fever pavilion (a.a.), then sent over to duty room of pavilion (b.b.).*	Infancy	2	Plane marks.	IV.	Never.
227*a* $\frac{\text{IV.}}{1}$	C——, Elizabeth (contracted outside?).†	F.	13	Oct. 13th	Oct. 26th	Acute scarlet fever pavilion (a.a.), or ambulance.	Unvaccinated				—
281 $\frac{\text{VII.}}{15}$	W——, Alice	F.	7	September	Sent home Oct. 31st; rash, Nov. 3rd.	Convalescent scarlet fever pavilion (b.b.).	Infancy	3	Marks	—	Never.
302 $\frac{\text{XV.}}{1}$	M——, John	M.	11	September	Sent home Oct. 31st; rash, Nov. 7th.	Convalescent scarlet fever pavilion (b.b.).	Infancy	2	Marks	—	Never.
302*a* $\frac{\text{IV.}}{2}$	M——, Annie	F.	7	Sept. 23rd	Nov. 9th	Convalescent scarlet fever pavilion (b.b.).	Infancy	2	Plane	IV.	Never.
391 $\frac{\text{XV.}}{1}$	M——, Mary	F.	4	Sept. 8th	Nov. 11th	Convalescent scarlet fever pavilion (b.b.).	Unvaccinated				Died Nov. 30th.

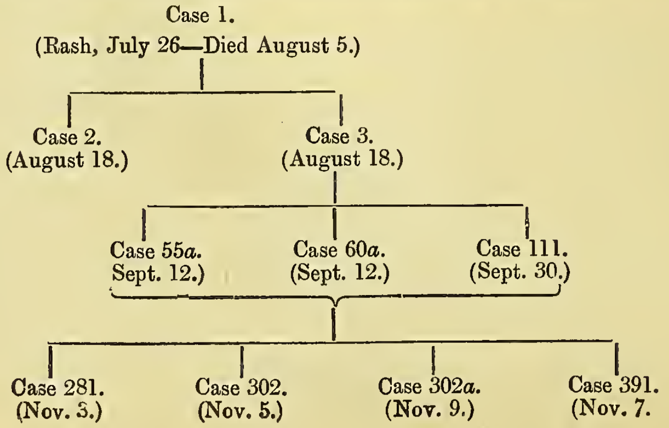
* Consequent spread in convalescent scarlet fever pavilion (b.b.) from both of these cases.

† The mother attributes the source of infection to her child being taken to the hospital in the same ambulance as a small-pox patient from same street 15 minutes before. The rash appeared 13 days afterwards.

NOTE.—Two of the above were unvaccinated (227*a* and 391), and none had been re-vaccinated; one of the two unvaccinated cases died. Eight of those attacked were under 14 years old, one was 24, and two 25.

Case 60, who attributes her infection to a visit to the fever hospital 14 days previously, is not included in this table. Nor does it include an unvaccinated child (Case 390), who was discharged from the scarlet fever ward November 7th, developed the rash of small-pox November 20th, and died November 28th.

DIAGRAM I., showing SPREAD of INFECTION within the Borough Isolation Hospital, and giving dates of Eruption. Case 207 and 227*a* are omitted, as there are alternative sources of infection.



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‡ Metropolitan Asylums' Board Report, 1891, pp. 61, 62.

yards from the Doecker tent in the Hospital grounds where R—— was placed on July 28th, whence he escaped on July 30, and where he died on August 5th. J. A—— developed the rash on August 19th.

His source of infection.

The source of his infection was a point of some difficulty, but the following facts merit consideration :—

1. Careful investigation showed that communication between the inmates and the officials of the two buildings was unlikely to have taken place.

2. The suggestion of aërial infection was favoured by the close proximity, but was rendered unlikely (1) in view of more probable explanations, and (2) by the fact that this (a well-vaccinated child of four years) was, as we shall see, *the only instance among all the cases which arose within the workhouse during the whole period of the epidemic where there was any doubt whatever as to direct infection.* There were on August 7th, 1892, 294 inmates and officials* residing in the workhouse, the main building of which is only 120 yards from the hospital, and the grounds of which are only separated from the hospital by a wall. If, therefore, the Hospital formed a centre for aërial convection, it is remarkable that all these persons should have escaped infection by this means.

3. Possibly infection was brought to him from the public-house already referred to (p. 11, para. 3) by some of the workhouse officials who were known to frequent it. August 5th would tally with his date of infection.

4. Possibly it was brought to him by some of the officials or inmates of the workhouse who frequently visited the little provision shop close to the workhouse, where Case 6 occurred (rash August 17th, p. 9.) R—— (the first case, Group I.) informed the constable who apprehended him that he had left the hospital to look for food. Would he not naturally enter a provision shop, which he must have passed at some time between 2 and 8 a.m.? At any rate, it was obvious, from subsequent events, that both this shop and the public-house were centres of contagion.

5. Many visitors and fresh admissions of the vagrant class, came to the workhouse in the early days of August, not only from Warrington (from the first infected lodging-house and elsewhere), but also from more distant places infected with the disease.

6. Two children, named L——, were admitted on August 2nd, and placed in the same dormitory with little A——, who had been in constant communication with their cousins in Mill Street, who developed so-called "chicken-pox" about this time. Subsequently the father of these latter died of confluent small-pox (Case 377).

It seems, therefore, highly probable that the origin of the infection of the first case in the workhouse was one of the last four named possible sources of direct contagion, though which particular one was hard to decide at the time of my inquiry.

As the Urban Sanitary Authority refused to take little A—— into the Borough Fever Hospital, he was taken (Aug. 26) over to the "fever ward" attached to the workhouse, and an attendant told off to look after him.

Subsequent cases.

I am indebted to the matron of the workhouse for the following very lucid account of the subsequent spread of the disease within the workhouse; the accuracy of which I had ample opportunity of confirming. The cases form a series of direct contagions from the little boy J. A——.

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* Infirm, 122; able-bodied, 107; persons under sixteen, 52; paid officials, 13; total, 294.

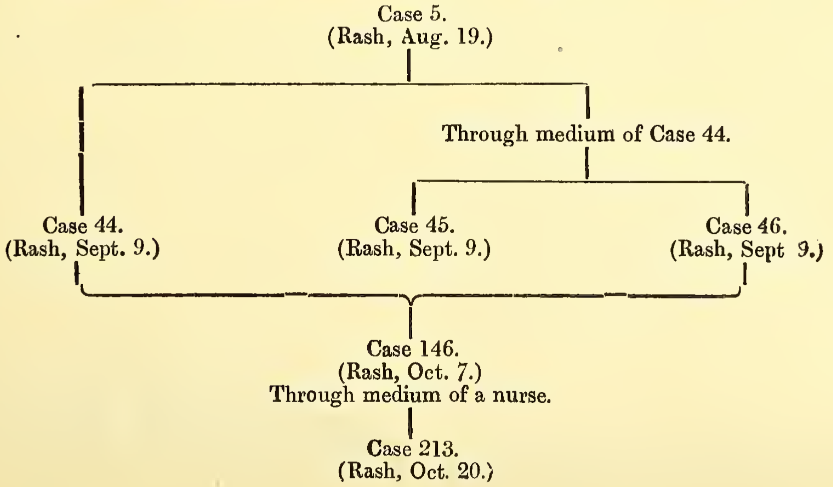
Table IV.

Particulars of Six Cases, forming part of Groups II., III., and IV., arising among the inmates of Workhouse.

Case No. and Book Reference	Name of Patient.	Sex.	Age.	Date of Rash.	Position.	Type of Case.	Primary Vaccination.				Re-vaccination.
							Date.	No.	Character.	Area.	
5 $\frac{V.}{4}$	A——, Josiah	M.	4	19th Aug.	Infants' school	Mild	Infancy	1	Fov.cic.	II.	Never.
44 $\frac{V.}{4}$	K——, Alice	F.	24	9th Sept.	Nurse	Mild	Infancy	2	Fov.cic. v. good marks.	I.	Never.
45 $\frac{V.}{4}$	C——, Mary	F.	19	9th Sept.	Female sick wards	Disc.	Doubtful.				Never.
46 $\frac{V.}{4}$	R——, Matilda	F.	19	9th Sept.	Female sick wards	Disc.	Infancy	Unknown.			Never
146 $\frac{V.}{4}$	R——, Geo.	M.	61	7th Oct.	Male sick wards	Disc.	Infancy	1	Faint Fov.	IV.	Never.
213 $\frac{V.}{4}$	H——, P.	M.	26	20th Oct.	Male sick wards	Disc.	Infancy	2	Fov.	II.	Never.

Diagram II.

Showing how Infection spread to Five Occupants of the Workhouse.



September 9th.

Second case (No. 44.), rash, Friday, September 9th, was a nurse, having good primary vaccination marks, but not re-vaccinated, who had carried little A—— over to the fever ward of the workhouse 14 days before, Friday, August 26th.

Third and fourth cases (Nos. 45 and 46) were inmates under the care of the nurse (Case 44). These two developed the eruption on the same day as the nurse, and were clear illustrations of conveyance of infection by a third person; who in this instance also contracted the disease herself.

October 7th.

Fifth case (No. 146, rash October 7th), contracted the disease from a nurse who now looked after the small-pox cases, to whom he went daily to have his leg dressed; another illustration of conveyance by a third person.

October 20th.

Sixth case (213), Philip H——, rash October 20th, contracted the disease by making the bed of Case 146, directly after the latter had been removed to the fever block of the Workhouse on October 7th.

Other cases.

Altogether 17 cases[*] were notified from the workhouse, but only these six contracted the disease within the building. All the others were brought in with the eruption on them, or developed it within a few days.

Procedure.

All leave of, and visitors to, officials and inmates, were stopped on August 20th. Measures of quarantine for fresh admissions were adopted (September 15th), and for the isolation of cases as they arose, were carried out as far as the resources of the workhouse would allow.

Re-vaccination.

During August all the officers were inspected and urged to be re-vaccinated, and many were done Some omitted or refused to be done, among whom was the nurse (Case 44).

Full particulars of the number of inmates re-vaccinated are given on p. 66, and it will be seen that only 59 were re-vaccinated prior to September 19th, when the small-pox cases were removed from the adjacent Fever Hospital to the temporary hospital in Dallam Lane.

Cause of spread in Workhouse.

Apart from the question of vaccination and re-vaccination, the cause of the spread of small-pox in the workhouse, as in the hospital, was deficient isolation. In all cases after the first, direct contagion could readily be traced. The remarkable absence of unexplained infections is commented on, on p. 66.

Up to October the workhouse had to provide accommodation for its own cases as they arose or were brought in. Afterwards the sanitary authority consented to receive them in the Temporary Hospital. Fresh admissions were often found to be infected with the disease, and had it not been for quarantine in the receiving ward, and good management, the disease must have spread.

It is, however, to the credit of the workhouse authorities that only six cases (·8 per cent.)[†] should have resulted among 712 inhabitants[‡] exposed in the workhouse, most of whom are of a low order of intelligence, and all dwelling in an institution neither designed by structure nor administration for the management and isolation of infectious disease.

E.—Other Consequences of Group II.

Factories.

August 1892.

It has been seen that as a consequence of the cases of Group II. the disease spread, (*a*) within the borough isolation hospital and (*b*) within the workhouse respectively. But infection was also carried to several different works and factories in the town:—

Infection of Dallam and Bewsey Forge.

(*c*.) *Dallam and Bewsey Forge*, the chief ironworks of the town, employ over 2,000 hands. Here the son of Case 13, worked all the while (10 days) that the case was unrecognised and unisolated. Here also the father of Case 10 worked for seven days, during which his son's disease was unrecognised and unisolated. Cases 8 and 9 were themselves employed in these works, and so also was the brother of Case 6. Thus were there already five different sources of infection to the operatives in this forge, which plays, as we shall see, such an important part in the subsequent history of this epidemic, by its contiguity to the Temporary Small-pox Hospital. Altogether 83 cases occurred amongst the 2,075 employed in these works during the year May 1892 to May 1893. They will be considered in detail subsequently (pp. 44 and 75).

Other works.

(*d*.) *A Fustian Cutting Shop* in Wakefield Street employing 100 hands also became infected. Here the sister of Case 8 (C——) worked during the three days he was at home and unisolated at a bench adjacent to the first girl attacked. The sister of Case 10 (B——) also worked here. Altogether 11 of the employés in this establishment were attacked.

(*e*.) *A Fustian Cutting Shop* in Aikin street was also early infected. 12 cases were taken in succession out of one of the rooms.

Consequences of delay.

We have seen that in consequence of the delayed isolation of cases in Group II. the disease spread within the hospital, and within the workhouse, and that various works in the town became infected. Table II. (p. 10) shows, in the right hand column, that eight cases, besides the workhouse and hospital ones, occurred soon afterwards in the already infected houses of this group.

Effects of non-recognition.

But the gross effect of Group II. was the production of a crop of 50 cases forming Group III., which will be dealt with next. And, beyond all doubt, the largest number of these fresh infections resulted from the cases seen by the doctor's assistant, who was acting in the absence of his principal. The evidence goes to show that three out of these four cases were extremely well-marked types of the affection. It is probable that the epidemic would have been stamped out at an earlier date if these four cases had been promptly recognised. It is certain that the epidemic, in that event, would never have reached the dimensions which it did.

August 23rd, 1892. Request for loan.

On August 23rd, 1892, the Town Council wrote to the Local Government Board, reporting the outbreak of small-pox, asking consent to borrow 800*l*. under the Warrington Extension and Water Act, 1890, to purchase a *temporary structure* for the reception of small-pox cases.

September 5, 1892, Local Government Board stated they were unable to sanction a loan to provide *temporary* accommodation.

Group III.

(August 30th to September 13th.)—50 cases.

August 30th. Daily numbers.

After Group II. no fresh cases developed the rash for six days, but on August 30th three persons showed the eruption, two more on the next day, the daily number gradually increasing up to eight on September 9th, and then gradually subsiding to one on September 13th; 50 cases in all during the 15 days, August 30th to September 13th.

Sources of infection.

The cases of the dressmaker living at the provision shop in Priestly Street, and the servant at the public-house in Green Street, already alluded to, were sources of infection to some. But the great majority of this group of cases could be traced to the three cases attended by the doctor's assistant, two of which (13 and 10) were treated at home as German measles for ten and seven days respectively, whilst the third (6*a*) was out and about all the time.

Position of cases.

Concerning the position of these 50 cases, three were in the workhouse, two in the hospital, and no fewer than 30 lived in the neighbourhood of the three patients just mentioned, close by the Old Fever Hospital in Whitecross Ward. The remaining 15 were scattered in different parts of the town, but traceable in almost every instance to some communication, on pleasure or on business, with the people in the infected quarter, the southern part of Whitecross Ward.[*]

August 30th Isolation o this group.

The largest number of small-pox cases which the Old Fever Hospital (Aikin Street) could receive was 13, and we have seen that this number was reached a week or more before this date, for the last Case in Group II. (Case 15, rash Aug. 23rd) was left in his own home on this account. What, therefore, was to be done with the 50 cases, Aug.

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[*] In addition to the six just mentioned, there were Nos. 32, 78, 206, 473, 474, 475, 487, 553, 557, 564, 610.

[†] As compared with 4·7 per cent. among the scarlet fever patients and officers in the Borough Fever Hospital.

[‡] Number of officers and inmates on August 7th, 1892, 294, add 66 fresh admissions per month (average) in August, September, October, November, and December, estimated at 352 = total, 713.

[*] The positions occupied by these 15 scattered cases, and the number of days spent at home with the rash out are as follows:—Golborne Street (15 days); Shepherds' Row (14 days); Dixon Street (never removed); Knutsford Road (never removed); Catherine Street (13 days); Winwich Street (admitted to and kept in workhouse); Church Street (7 days); two cases in Pierpoint Street (10 and 11 days respectively), where so many Dallam and Bewsey men lived; Hopwood street (never removed); Church Street (nine days); Latchford (10 days); Kendrick Street (unremoved); Cockhedge (9 days); Bewsey Road (unremoved).

30th to Sept. 13th? As beds became vacant, four of them were taken into the hospital, but—

26 of them were left at home for periods varying from 3 to 22 days with the eruption out.

14 others were never removed to hospital at all,*

4 remained in the Workhouse, and,

2 were already in the Hospital.

September 6th, 1892. Addition to old hospital.

On this date the Town Council, at their monthly meeting, empowered the medical officer of health and the borough surveyor to purchase a suitable structure for the reception of small-pox cases, which was to be erected on land that it was proposed to acquire, situated behind the Borough Fever Hospital, Aikin Street.

This land was finally, after two years' deliberation, bought by the Town Council at their meeting on October 4th.

Arrangements were made for a building of the same size as the existing pavilions, to be completed in 14 days. But by September 8th 38 cases had been notified, by September 10th 46 cases, by September 12th 53 cases, and it soon became obvious that it was too late to adopt such measures as these, and that far larger accommodation would be required.

As a matter of fact this building was never used for small-pox cases. Its completion did not take place until far into October, and was then made use of to relieve the overcrowded state of the other parts of the Old Fever Hospital with scarlet fever patients.

September 6th.

The medical officer of health had at various times made suggestions, both before and after the commencement of the outbreak, as to certain desirable procedures, but it was not until the meeting of the Town Council, on September 6th, that "the medical officer of "Health was empowered to do everything he might consider "necessary under the emergency."

September 19th, 1892. Opening of a new hospital.

On the representation of the medical officer of health the Sanitary Authority began, in the early part of September, to take steps to provide additional accommodation in the northern part of the town. HERE SOME DISUSED IRONWORKS WERE CONVERTED INTO A TEMPORARY HOSPITAL, AND OPENED FOR THE RECEPTION OF CASES ON MONDAY, SEPTEMBER 19TH, 1892.

The building was situated at the end of Dallam Lane, on the northern fringe of the inhabited part of the town, and it was known as the DALLAM LANE, NEW, OR HOPE HOSPITAL.

Sixty-four cases of small-pox were notified up to this time (September 19th), which was in many ways the most memorable date in the history of the outbreak, as will subsequently be seen.

11 cases in the OLD HOSPITAL were then removed to the NEW one; and the centre of infection seems also to have shifted about this time from Howard Street, beside the old hospital, to Dallam Lane and other streets near the new hospital. The causes of this transfer will be considered on p. 69 (Part II.).

Vaccination September 7th, 1892.

The ordinary arrangements for vaccination are that vaccinations are done once a week at one station in Golborne Street for the whole town.

On September 7th, 1892, in pursuance of a recommendation from the public vaccinator, the guardians arranged to open a special additional vaccination station, at Priestly Street in the infected district beside the Old Borough Fever Hospital, for four weeks, for the purpose of carrying out re-vaccinations one day per week.

GROUP IV.

(September 18th to November 12th.)—308 cases.

September 17th. Weekly number of cases.

There had been a lull in the cases during the week ended Sept. 17th, during the last five days of which only two cases occurred; and it seemed as though the consequences of the non-recognition and non-isolation of the earlier cases were dying away. But next week (ended Sept. 24th), 27 persons developed the rash; 35 the next (Oct. 1st), and the weekly figure varied between these numbers up to Nov. 5th. Finally, during the week ended Nov. 12th, 88 persons developed the eruption.

Source of infection.

Group IV. is clearly traceable to the cases left at home by reason of the lack of the hospital accommodation (Aug. 23), which was remedied by the temporary hospital on Sept. 19th. For two weeks (from about Sept. 5th to Sept. 19th), *i.e.*, until the opening of the New Temporary Hospital, there was no place to which cases as they arose could be removed; and we find on this date, Sept. 19th, that there were no fewer than 46 cases of small-pox which had remained in their own homes, after the appearance of the rash, for periods varying from 7 to 21 days, surrounded by ignorance, dirt, and in many cases destitution; for, as we shall see, all the infected houses in the Warrington epidemic, with few exceptions, belonged to the labouring and lower classes.†

Situation.

As regards the situation of these 46 unisolated patients, 28 of them lived in the neighbourhood of the Old Fever Hospital (Whitecross Ward), near, and mostly in same street as S—— (13), H—— (6*a*), and B—— (10). The other 18 were scattered pretty evenly over the rest of the town.‡

Isolation.

Thus we see that there were on Sept. 19th 46 persons each capable of forming a centre for the spread of the disease, and it is not difficult to account for the continued increase in the number of cases. Eighteen of these 46 were never admitted to hospital at all; the others were, after Sept. 19th, removed as fast as accommodation could be provided in the New Hospital, but the resources of the town were taxed to the uttermost.

Climax week and its cause.

As to the cause of the excessive number during the week ended Nov. 12th, it may be seen, on referring to a period two weeks prior to this one, that between October 14th and October 26th there were 25 cases* of delayed removal for varying periods of time from 3 to 14 days after the rash appeared, and five others were never removed at all. It will be a matter for subsequent consideration (p. 69) how far, and in what manner, the New Hospital itself acted at this time (Oct. 26th) as a means of spreading the disease, for many cases arose around it. 36 of these 88 cases arose among the Dallam and Bewsey forgemen, the cause of which is referred to on p. 75.

At this point (Nov. 12th) the epidemic reached its climax. Hereafter we only have to consider the continuance (Group V.), and the decline (Group VI.) of the epidemic.

Change of infection centre. October 1892.

As regards the position of the earlier group of cases we saw that they arose largely beside the Old Fever Hospital, that is among the inhabitants of Howard Street, where S——, H——, and B—— (p. 9, *ante*) lived. But in October and November the centre of infection seems to have been changed to the northern end of Dallam Lane, Stamford Street, Pierpoint Street, and Winwick Road, streets in the neighbourhood of the New Hospital.

It will subsequently be seen (pp. 67 and 68) that the arrangements for enclosing this New or Temporary Hospital, and cutting off communications, were very imperfect, and that this establishment itself constituted a prolific source of infection to the inhabitants of the town in general, and those living near in particular.

September 21st, 1892. Quarantine at workhouse.

On September 21st, 1892, the Guardians decided to establish 14 days' quarantine for all fresh admissions to the workhouse, the workhouse board-room to be converted to that purpose.

September 24th, 1892. Appointment of assistant medical officer of health.

Mr. J. Guest Gornall, M.B., M.A., was appointed by the Health Committee to assist his father, the medical officer of health, and he took up the duties of medical officer at the New Hospital on October 4th. He resided at the Old Hospital like the rest of the staff of the New Hospital, and, like them, came backwards and forwards daily until November 9th, when sleeping provision was made for them at the new building.

October 25th.

Dallam Lane, beside the New Hospital, was ordered by the Town Council to be barricaded.

November 8th 1892.

The town clerk wrote to the Local Government Board stating that 30 cases of small-pox had been reported in the preceding

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* The numbers and positions of these 14 *unremoved* cases are as follows:—No. 19, in Howard Street, No. 23, in Howard Street, No. 28, in Howard Street, No. 29, in Howard Street, No. 33, in Dixon Street, No. 36, in Knutsford Road, No. 24, in Wakefield Street, No. 39, in Bostock Street, No. 56, in Wakefield Street, No. 58, in Hopwood Street, No. 47, in Selby Street, No. 59, in Kendrick Street, No. 48, in Brierly Street, No. 55, in Bewsey Road.

† Numbers of the 46 cases unisolated on Sept. 19th:—14, 15, 18, 19, 20, 23, 24, 25, 26, 27, 28, 29, 30, 30*a*, 31, 32, 33, 34, 35, 36, 37, 38, 39,, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, and 64.

‡ Cases of delayed removal scattered over the town on Sept. 19th, not in the Whitecross Ward. The numbers in brackets signify the days spent at home with rash out. 31 (15), 30 (14), 37 (13), 40 (7), 43 (11), 49 (10), 50 (9), 51 (10), 57 (9); and nine were never taken to hospital at all, viz., Nos. 33, 36, 32, 44, 45, 46, 58, 59, 55.

* Numbers 182, 188, 224, 183, 184, 185, 189, 212, 193, 194, 196, 197, 203, 235, 198, 204, 205, 209, 211, 214, 220, 228, 229, 232, and 234. Five others were never removed at all, Numbers 173, 186, 190, 213, 260.

Assistance sought from Local Government Board.

24 hours, and asking that Board *to make regulations* under the Epidemic and Other Diseases Prevention Act, 1883. to enable the Corporation to cope with the epidemic by means of house-to-house visitation, and the compulsory isolation of patients and of persons who had been in contact with them.*

November 11th.

The Local Government Board declined to accede to this request; but a few days later an inspector of the Board (Dr. T. W. Thompson) was sent to Warrington, who recommended the Sanitary Authority to adopt measures—(1.) For increased accommodation of small-pox patients away from inhabited dwellings; (2.) For additions to the staff of inspectors of nuisances; (3.) For increasing the scavenging staff; (4.) For promoting facilities for vaccination and re-vaccination. These were carried out on Nov. 16, as mentioned below.

Inspector visits town.

Group V.

(November 13th to December 10th.)—102 cases.

Weekly numbers.

After the climax week (November 12) we find that the weekly number only dropped to about where it had been before. 26, 25, 30, 21 persons developed the rash in the four succeeding weeks respectively.

Source of infection of Group V. Second hospital breakdown.

The fact that 88 persons developed the rash during the week ended November 12th has been mentioned. This figure, added to the 131 cases already in hospital at the commencement of that week, makes a total of 219 cases to be dealt with on the date named. But, even with the additional accommodation provided, it was impossible to find room for all the cases which arose during this week, and thus *a second deficiency* in the hospital accommodation took place. Fifty-nine of the 88 persons attacked during the climax week lacked prompt removal, being at home three or more days with the rash out, chiefly for want of room in the New Hospital. Hence the weekly numbers during the four weeks now under consideration (November 13 to December 10) only dropped back to their former position, albeit the means of recognition (by experience), notification, and removal were gradually becoming more perfect.

November 2nd, 1892.

On November 2nd the public vaccinator asked the guardians to be enabled to vaccinate upon an additional day each week, but the guardians refused permission.

November 16th, 1892. The guardians yield.

On November 16th, in pursuance of recommendations from Dr. Thompson, one of the Inspectors of the Local Government Board, THE GUARDIANS afforded increased facilities for re-vaccination, (1) by opening the public vaccination station on an additional afternoon and an evening each week; and (2) by appointing two assistants to the vaccination officer for house-to-house visitation. All to remain in force for six months.

December 6th, 1892. Five extra vaccination stations.

In pursuance of resolutions adopted at a meeting of the medical men in Warrington, the TOWN COUNCIL empowered the medical officer of health to establish five stations for gratuitous vaccination in the borough, and to secure the services of five medical practitioners to perform vaccination.

Placards.

Placards urging the inhabitants to be re-vaccinated were posted over the town.

During the later part of November and early part of December large numbers of people flocked to the vaccination stations, now seven in number, to be re-vaccinated.

Group VI.

(December 11th to May 10th.)—187 cases.

December 11th.

But why pursue the narrative further? Up to December 10th 460 cases had been notified. The houses, shops, inns, and other places of public resort in the town were by this time pervaded with the poison. On the other hand the inhabitants were now more on the look-out for the disease,† were more fully alive to its contagious and fatal nature, and were now doing their best, in their own simple way, to co-operate with the authorities to check its spread by avoiding contagion and getting re-vaccinated; the doctors by experience were more ready to recognise its earliest manifestations; and lastly, the authorities, now aroused, were able to cope with the more moderate number of fresh cases. We may perhaps also assume that the number of susceptible people was daily lessening?

It is estimated by the Medical Officer of Health that over one-third of the population had been re-vaccinated by the middle of December.

Weekly numbers.

Taking always the persons who developed the eruptions during the week, the weekly numbers dropped on December 17th to 7, and ensuing weeks to 10, 6, 7, &c. (*vide* Chart, p. 8).

The average number of cases per week from December 11 to May 10th was eight. Once only was there any marked deviation above this, during the week ended April 1st, when 18 cases developed the rash. If we examine the nine cases which developed the rash on the 10 days ended March 19th, *i.e.*, two weeks before, we find that three of those nine cases remained at home with the eruption out for four, six, and five days respectively. Then the weekly numbers dropped again.

Throughout the epidemic the daily and weekly number of cases preserved the usual wave-like character. Finally, the numbers became less and less, gradually but irregularly, like the waves of a receding tide.

Summary.

CHRONOLOGICAL SUMMARY of action of LOCAL SANITARY AUTHORITY, and of CENTRAL AUTHORITY, as regards HOSPITAL PROVISION.

1881.—Borough Infectious Diseases Hospital (Aikin Street) provided with 28 beds.

1888.—Dœcker Tent (two beds) added. Total 30 beds, or one bed for every 1,800 inhabitants in 1892.

AUGUST 1890.—Provision made for enlargement of existing hospital for infectious disease in the Warrington Extension and Water Act, 1890.

MAY 1892.—Medical Officer of Health urges, for a second time, the need for better provision for small-pox and fever.

JUNE 1892.—Town Council decide to negotiate for one acre of ground near the Old Borough Fever Hospital, as the time limit of two years provided in the Act of 1890 will shortly expire.

JULY 1892.—Medical Officer of Health again presses, pointing out that accommodation is inadequate even for scarlet fever.

AUG. 23, 1892.—Town Council ask Local Government Board to sanction loan of 800*l.* to provide *temporary* small-pox accommodation.

AUG. 26, 1892.—Doecker Hut accidentally burnt down.

SEPT. 19th, 1892.—Opening of the disused ironworks for reception of small-pox cases. (Temporary or Hope Hospital in Dallam Lane.)

NOV. 8th, 1892.—Corporation ask the Local Government Board to make special regulations (under Act of 1883) to enable them to cope with epidemic.

NOV. 11th, 1892.—Local Government Board inspector visits the town and recommends Corporation to provide further accommodation for small-pox, removed as far as possible from inhabited dwellings.

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* The Act of 1883 only confers *borrowing* powers. Application had not been made under Section 134, Public Health Act, 1875, which confers powers on the Local Government Board to make *Regulations* in time of danger as regards England.

† Many cases were detected and notified to the medical officer of health by the relatives of the patients.

CHRONOLOGICAL SUMMARY of the provision for VACCINATION and RE-VACCINATION.

January 10th, 1872, a Vaccination Officer was for the first time appointed in Warrington (under Act of 1871).

The population a well-vaccinated one in 1892.

Usual arrangements for vaccination :—The public vaccinator attends once a week in the afternoon. (Golborne Street.)

SEPT. 7th, 1892.—Special vaccination station opened one afternoon a week in the infected district for four weeks. (Priestley Street.)

Nov. 2nd, 1892.—Guardians refuse to open the public vaccination station on an additional day each week.

Nov. 16th, 1892.—Guardians, on suggestion of Local Government Board inspector, open public vaccination station on an additional afternoon and one evening each week; and appoint two assistants to vaccination officer for house-to-house inquiry.

DEC. 6th, 1892.—On the recommendation of the medical profession in the town, the Town Council establish five free vaccination stations.

Further detail will be found in the foregoing narrative and also in Part II. of this report.

SUMMARY OF NARRATIVE.

In conclusion, as regards the Warrington epidemic of small-pox, 1892–93, it may be gathered from the foregoing narrative :—

First. That the preliminary outbreak in May 1892 (consisting of three imported cases, and one secondary case), was effectually dealt with by isolation, disinfection, and quarantine; the only secondary case being a man employed in the necessary procedures.

Secondly. That after an interval of two months a navvy of the wandering class, living at a common lodging-house, was brought to the hospital with the disease. The source of his infection is unknown.

Thirdly. That the 15 cases forming Group II. arose by infection, directly or indirectly, from the navvy, who, from one cause or another, at different times, was not sufficiently isolated.

Fourthly. That the spread within the Fever Hospital was due to insufficient isolation of the earlier cases, owing chiefly to its overcrowded state; and possibly also, non-vaccination and non-re-vaccination of the inmates.

Fifthly. That the spread within the Workhouse was due to insufficient isolation of the first case therein.

Sixthly. That the 50 cases forming Group III. were traceable to infection from cases in Group II. owing to their insufficient isolation; and that the major portion of these 50 cases arose among persons in communication with the three cases seen but not recognised by a doctor's assistant.

Seventhly. That Group IV. (308 cases) arose in consequence of the non-isolation of cases in Group III., owing to lack of accommodation in the Old Borough Fever Hospital situated in Aikin Street.

Eighthly. That Group V. (102 cases) similarly arose from persons in Group IV. insufficiently or not promptly isolated, because, for a second time, the limit of hospital accommodation had been reached, although in the interval an additional structure had been temporarily converted into a hospital for isolation purposes—the Temporary or Hope Hospital in Dallam Lane.

Ninthly. That the disease gradually declined as re-vaccination became more general and as the means of coping with the epidemic became more perfect.*

CONCLUSION.

It will be gathered from the foregoing narrative that insufficient or imperfect isolation was an extremely important factor in the causation of the Warrington small-pox epidemic 1892–3. This was owing, in some instances at the commencement, to the non-recognition of certain cases by a doctor's assistant; but it was also due in a much larger degree to an absence of ordinary hospital accommodation for the reception and isolation of the patients as soon as they were attacked and identified.

The sanitary authority had neglected to act on the recommendations of their medical officer of health in this matter of hospital provision. The purchase of additional land for that purpose was contemplated in the summer of 1890, but it was not carried out until October 1892.

It is rendered evident from a close examination of the facts of the epidemic that if the town of Warrington had possessed adequate hospital accommodation for infectious disease the epidemic would probably never have reached the dimensions it did, and the disease would, in all probability, have been limited to a few cases in certain quarters of the town.

After a statement on the cost of the epidemic, the important subject of Vaccination, which has been investigated in some detail, will be considered, and will occupy the whole of Part II.

In Part III. of this Report the question of Isolation will be considered more in detail under five heads :—

1. Removal of case to hospital;
2. Quarantine (isolation) of relatives and friends;
3. Hospital accommodation;
4. Hospital administration;
5. Position of hospital; and Aërial Spread,

together with the subjects of Recognition of the disease, Notification, Disinfection, and other preventive measures specially applicable to small-pox.

Part IV. will be occupied with General Hygienic and Social questions.

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* Since May 10th, 1893, up to the present time (December 1893) 24 cases have been notified as follows: 11 in May, 10 in June, 3 in July. None have been notified since July 24th, and the temporary hospital was closed on August 29, 1893.

Cost of the Warrington Epidemic 1892–93.

Explanatory.

It is somewhat difficult to gauge the cost of an epidemic. But an attempt will be made to deal with the subject under the following heads:—

- (*a.*) Expenses incurred by the corporation in connexion with the Old Fever Hospital (Aikin Street) - - - - - £882
- (*b.*) Monetary cost in connexion with the Temporary Hospital provision - - - £7,160
- (*c.*) Expenses incurred by the corporation in making special provision for vaccination - £90
- (*d.*) Expenditure incurred by the guardians in respect of vaccination, out-relief, or hospital maintenance - - - - - £603
- (*e.*) Damage to trade.
- (*f.*) Sick clubs.
- (*g.*) Social and other consequences.

(*a*).—Actual Expenses incurred by the Corporation in connexion with the Old Borough Fever Hospital (Aikin Street) including Removals, Compensations, and Notification Fees.*

	£	s.	d.
Salaries of staff - - -	636	3	6
Notification fees (other than small pox) - - - - -	57	2	6
Medical and surgical appliances and disinfectants - -	158	19	1
Coal, gas, water, and taxes -	337	11	11
Provisions - - - -	758	18	8
†New disinfector and fitting -	361	8	4
†Costs for land beside old hospital	821	13	9
†New pavilion and repairs to old buildings - - -	997	13	6
Other establishment expenses, including removals - -	415	3	10
Total - -	4,544	15	1
The estimated expenditure on this account for the year ended March 25, 1893, was 1,047*l.* 12*s.* Owing to the scarlet fever epidemic this would probably have been nearly doubled, therefore deduct - - - -	2,000	0	0
Balance - - -	2,544	15	1

† The whole of the first two of these items and part of the third should not altogether be charged to the small-pox epidemic, therefore a further deduction might be made of 1,662*l.*, leaving finally **882*l.* as chargeable to small-pox.** This method of exclusion is the only way to arrive at the cost incurred through small-pox in the Old Hospital.

(*b.*)—Expenditure incurred by the Corporation in connexion with the New or Temporary Hospital, including Removals, Compensations, and Small-pox Notification Fees.‡

	£	s.	d.
Salaries of staff - - -	699	18	0
Medical and surgical appliances and stimulants - - -	168	3	0
Temporary buildings, &c. -	849	8	11
Rent, rates, and taxes - -	175	13	0
Furnishing account - -	1,102	17	6
Provisions account - -	1,116	9	10
Other establishment expenses, including compensations (20*l.* 14*s.*) and removals - - -	247	13	7
Fees for notification - -	50	2	6
	4,410	6	4
Add to this the further expenditure as estimated by the borough treasurer from March 25th to August 1893 - - -	2,750	0	0
Total - -	7,160	6	4

(*c.*)—Expenses incurred by the Corporation in respect of special provision for Vaccination and Re-vaccination.*

	£	s.	d.
Fees to medical men - -	60	18	0
Purchase of lymph - - -	26	2	0
Hire of stations - - -	3	0	0
Total - - -	90	0	0

(*d.*)—Expenditure incurred by the Guardians.†

	£	s.	d.
1. Additional vaccination, about -	103	0	0
2. Out-relief caused by members of families being in hospital or prohibited from work, about -	100	0	0
3. Expenses incurred by the guardians, as rural sanitary authority in providing hospital treatment for persons suffering from small-pox - - -	400	0	0
Total (equal to a penny rate on the whole rural district) -	603	0	0

Total Cost, and how met.

It will be seen that the total cost incurred by the town council was £8,132. This will be charged on the "improvement rate." It has already necessitated an increase in the rate of 1893 of 8*d.* in the £ and it will necessitate a further increase of 5*d.* in the £ which will probably be charged to 1894. Thus the sum of £8,132 has involved a special small-pox rate of 13*d.* in the £ on the rateable value of the borough.

The cost to the guardians amounts to about 600*l.*, and this the clerk states is equivalent to an increase of a 1*d.* rate on the whole rural sanitary district.

The Expense of Panic.

The average cost to the rates of 1,165 small-pox cases in different parts of the United Kingdom during the past few years amounts to £8 11*s.* per case (*British Medical Journal*, May 23, 1893). In the Warrington epidemic, 1892–3, there were altogether 667 + 24 = 691 cases, and these should not, therefore, have cost the rates more than a total of £5,908 1*s.* But we have seen that these cost £8,132, or £2,224 too much, and this additional expenditure was undoubtedly due to the authorities having delayed action until they were actually in presence of an epidemic.

(*e.*)—Damage to Trade.

Trade.

The following may be taken as examples:—A leading draper in the town writes, in answer to inquiries, that the firm has certainly lost in actual money 500*l.* by reason of the small-pox epidemic, during the six months ending March 25th, 1893.

The principal jeweller in the town writes that the profits of the firm for the year ending March 25th, 1893, when compared with those of the preceding year, show a decrease of 400*l.*

One of the chief corn and flour dealers in the town reports that his gross receipts for the six months ending March 25th, 1893, were 900*l.* less than in the corresponding period ending March 25, 1892; he also adds "We had a number of accounts closed by customers "living outside the town, which we have not yet succeeded in getting back."

Extracted from the borough treasurer's report for the year ended March 25th, 1893.

† From the borough treasurer's report for the year ended March 25th, 1893.

* Extracted from the borough treasurer's report for the year ended March 25th, 1893.

† From information supplied by the clerk of the guardians.

The leading butcher in the town writes that his gross receipts for the six months ending March 25th, 1893, were 1,000*l.* less than during the corresponding period ending March 25th, 1892.

The excise officer reports a difference of 2,275 quarters of corn during the 12 months ending March 25th, 1893 (12 months ending March 25th, 1892, 5,514. 12 months ending March 25th, 1893, 3,239).

Expenditure by employers of labour in providing *gratuitous vaccination* for their employés, estimated at not less than 150*l.*

(*f.*)—SICK CLUBS.

Sick Clubs. Of course the sick clubs were affected to some extent, but not so much as one would expect, since the disease affected the indolent, ignorant, and non-saving classes more than those who belong to sick clubs.

I am indebted to the various secretaries for the following returns which show the cost incurred by the respective societies on account of small-pox.

They chiefly consist of sums paid to members out of work through the disease.

	£	*s.*	*d.*
Order of Foresters - - -	18	10	0
Order of Gardeners - - -	21	6	0
Order of Druids - - -	27	14	2
Order of Shepherds - -	74	0	0
Total - -	£141	10	2

There were no special small-pox associations started.

(*g.*)—SOCIAL AND OTHER CONSEQUENCES.

Panic. Meetings and social gatherings of all sorts were of course at a standstill, and entertainments which had been previously arranged had to be postponed or abandoned at a heavy financial loss to their organisers.

Indeed, the acts of the Town Council and the other authorities were but imperfect indications of the panic which at one time (especially in November and December) existed among the townsfolk, and their earnest desire to be rid of the insidious and fatal foe.

Deaths. Among the sixty-two persons who were certified to have died of small-pox between May 10th, 1892, and May 10th, 1893, forty-one were over 21 years of age, and thirty-four of these were married men or women, very nearly all of whom left families motherless or fatherless.*

Wages. The loss of wages by sufferers from the disease, and by others who were debarred from following their employment, was one of the serious losses due to the epidemic. The disfigurement for life, which followed in some cases, should also be borne in mind in this connexion.

Misery. But no figures can adequately gauge the misery, and often the destitution and degradation, into which whole families have been plunged by the illness, and sometimes death of their relatives; nor can figures, even were they forthcoming, accurately express the far-reaching mischief and inconvenience caused to the manufacturer, the worker, and to all classes of the community.

ESTIMATED COST OF THE WARRINGTON SMALL-POX EPIDEMIC OF 1892–3 TO THE COMMUNITY.

	£	*s.*	*d.*
Expenditure of the various authorities as above mentioned - - -	8,735	0	0
Cost to employers of providing re-vaccination for their work-people (estimate)	150	0	0
Loss of wages of persons who contracted small-pox and of their friends at the time of quarantine (estimate) - -	500	0	0
Funeral expenses of persons who died from small-pox (estimate) - -	124	0	0
Cost to the parish authorities, sick clubs and others, of providing relief during and after the epidemic to those affected (estimate) - - - - -	500	0	0
Probable value as wage-earners to the community of persons who died from small-pox (estimate) - - -	6,820	0	0
Cost to the sick clubs during the epidemic, and to the parish authorities, sick clubs and others of providing relief *after the epidemic* to those affected (estimate) -	250	0	0
Damage to trade (estimate) - -	5,000	0	0
Total - -	£22,079	0	0

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* Out of the remaining 10, 4 were unmarried and of 6 no social particulars could be obtained.

PART II.

The relations of Vaccination and Revaccination to the Small-Pox Epidemic in Warrington, 1892–3.

(Charts showing summaries of results, see end of this Part, p. 54.)

Division of the subject.

The evidence concerning Vaccination will be arranged in twelve sections :—

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SECTION A.—ARRANGEMENTS FOR PUBLIC VACCINATION AND REVACCINATION IN THE BOROUGH OF WARRINGTON.

Ordinary provision by Guardians.

The Board of Guardians is, as usual, the authority responsible for the administration of the vaccination laws within the Warrington Union. The Union includes, but is more extensive than, the Borough, having in 1891, a population of 84,922 and an acreage of 31,168, as compared with 52,743, and an acreage of 1,968 in the Borough.*

But as regards the Borough, the ordinary provision for vaccination consists of one vaccination station in Golborne Street, where the Public Vaccinator (Mr. John H. Gornall, the Medical Officer of Health) attends one afternoon each week, the Vaccination Officer being Mr. Geo. Holford. The vaccinations in the Warrington Workhouse are done by the Medical Officer (Mr. C. N. Spinks).

Extra-ordinary provision by Guardians.

On September 7th, 1892, in pursuance of a recommendation from the Public Vaccinator, the Guardians arranged to open a special additional vaccination station at Priestly Street, in the infected district, one day a week for four weeks.

On November 2, 1892, the Guardians declined to open the public vaccination station in Golborne Street on an additional day each week.

On November 16, in pursuance of recommendations from Dr. Thompson, one of the Inspectors of the Local Government Board, the Guardians afforded increased facilities for revaccination, (1) by opening the public vaccination station on an additional afternoon and one evening each week; and (2) by appointing two assistants to the Vaccination Officer for house-to-house visitation. All to remain in force for six months.

Extra-ordinary provision by Town Council.

On December 6, 1892, in pursuance of resolutions adopted at a meeting of the medical men in Warrington, the Town Council empowered the Medical Officer of Health to establish five station for gratuitous vaccination in the borough, and to secure the services of five medical practitioners to perform vaccination.

Provision for vaccination made by employers of labour.

The Dallam and Bewsy forge hands, numbering 2,075 men and boys, were early involved in the epidemic, and one of the mills was at one time on the point of being stopped. There was at first some apathy and opposition on the part of these workmen to the practice of vaccination; they could not be persuaded of the necessity. However. the Sick Fund Committee of the Works, *i.e.*, a committee of the men's representatives, acting on the suggestion of Mr. T. Morris, the manager, and Dr. Adams, the medical officer of the works, passed the following resolution on November 12, 1892 :—

"That any member who remains unrevaccinated after " Monday, November 21st, 1892, shall not be entitled to " any sick benefit should he be afflicted with small-pox." The expense of revaccination was borne by the sick fund.

Dr. Adams states that, as a consequence of this, between 1,400 and 1,500 hands were revaccinated during the last two weeks of November, and a good many others were done by their private doctors.

The fall in the number of cases of small-pox occurring among these workpeople after this date is referred to on pp. 44 and 75, *post*.

Most of the other employers in the town took steps during November to persuade their hands to be revaccinated either by offering it free of expense (*e.g.*, Longford Wire Works, Walker's Brewery, Tanner's Lane Tanning Co., Armitage and Rigby, Platt's Fustian Cutting Shops, and Whitecross Wire Works), or, by threatening dismissal. A table showing the incidence of small-pox in the different works will be found in Part IV. (p. 85, *post*).

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* *See* Part IV., p. 82.

Form of House-to-House Visiting Book used in this Inquiry.

Address ______________________.
House and Street ______________________.
Through Ventilation ______________________.
Bedrooms ______________________.
Other Rooms ______________________.
Cleanliness ______________________.
Repair ______________________.

Ventilation and Lighting ______________________.
Sink ______________________.
Floor Gulley ______________________.
Bath ______________________.
Closet ______________________.
Refuse-disposal ______________________.

Further details as to any Insanitary Condition observed } ______________________.
Disinfection ______________________.
Home-Isolation ______________________.
Home-work ______________________.
Source of Infection ______________________.
Cases in Vicinity ______________________.

No. of Case.	Name.	Sex.	Age.	Occupation.	Place of Work or School, and Last Attendance.	Previous Attacks of Zymotic Disease or Previous Health.	Date of					Attack.		Primary Vaccination of all the Inmates.				Re-Vaccination of all the Inmates.		Further Remarks as to Vaccination.	Doctor and Date when first seen.
							Notification.	Onset.	Rash.	Removal to Hospital.	Termination.	Type.	Result.	Date.	Marks.			Date.	Result.		
															No.	Character.	Area.				

Points wanting in Case Register ______________________.
Date of Visit ______________________.
Informant ______________________.

SECTION B.—METHODS OF THIS INQUIRY.

My inquiries into the *vaccinated condition of the inhabitants* have been carried on both in the infected and uninfected houses.

Infected houses.

a.—The inquiries at the infected houses, which were scattered about the town, were conducted by myself, in person, with a few unimportant exceptions; and many of the cases of small-pox I saw while in hospital, by the courtesy of the Assistant Medical Officer of Health, as well as at their own homes.

The particulars inquired into comprised the items mentioned on the preceding page, printed in a double page manuscript book. ("House to House" note books.) The particulars so obtained have been summarised into schedules, tables, and lists.

Date.

The investigation so conducted has been attended with some labour; but it seemed to be the only way to obtain accuracy of fact in detail, such as could form a basis for logical deduction. It was commenced in December 1892, and necessarily extended over many months, but the facts elicited *always had reference to the time when the eruption of small-pox appeared in the household.*

Total infected houses.

Altogether there were 457 buildings infected between May 10, 1892, and May 10, 1893. Access and information were not denied to us at any of these; but those buildings where precise particulars as to the vaccinated condition of the *other* inmates were not obtainable, have been excluded in making the vaccination tables. They were 20 in number:—

1 Borough Fever Hospital, } by reason of their
1 The Workhouse, } size and shifting
4 Common lodging houses, } population.
14 houses where the inmates had left and could not be traced to their new abodes,*

leaving a balance of 437 houses as the basis of most of our calculations.

A table showing the number of houses in which more than one case arose will be found at the end (p. 98). The 20 houses excluded from attack-rate calculations, contained 49 cases.

Uninfect houses.

b.—In order the better to arrive at a true idea of the vaccinated condition of the people, a house-to-house visitation of houses *not invaded* by small-pox on similar lines to the above was made in the early part of 1893, under my supervision, by Drs. W. W. Lake and W. H. Fielden. The inquiries of these gentlemen were retrospective, and *had reference to the vaccinated state on August 1st*, 1892.

Date.

And in order to bring this inquiry within more reasonable limits, it was confined to a highly infected district around the old Borough Fever Hospital in Aikin Street.

In every possible instance we satisfied ourselves by inspection of the arms as to the vaccinated condition of the inmates. This was done in considerably more than half. It was found, on many occasions, that a determination to see for ourselves was an incentive to our informant to be precise as to the truth of any other evidence submitted to us.

This inquiry had reference to a representative district of the town as regards houses and people, and we had reason to believe from inquiries at other houses (uninfected and infected) in different parts of the town, that the results accurately represented the average condition of all the inhabitants.

SECTION C.—EXPLANATORY AND DEFINITIONS.

Vaccination classes.

Preliminary to what follows, it is necessary to explain that six "Vaccination Groups" have been adopted. The first three classes refer to persons vaccinated once only during their lifetime, generally in infancy. The fourth class refers to persons who have never been vaccinated; the fifth to those who have been vaccinated successfully twice or oftener during their lives; and the sixth to those who had previously had small-pox.

All the six groups mutually exclude each other, except in those few tables where it is expressly stated otherwise Thus, if a person came in Class VI., by reason of having previously had small-pox, he would be excluded from all the other columns; and if an individual has been successfully re-vaccinated he is placed only in Class V.

Class I.—"*Well-vaccinated*" includes all persons whose primary vaccination scars are fairly well marked in their foveation (or pitting), and of an aggregate area (irrespective of number) of half a square inch and upwards.

Class II.—"*Indifferently vaccinated*" includes (a) persons whose primary scars, though foveate, are in the aggregate (irrespective of number) under half a square inch area; and (b) other persons whose primary marks, irrespective of number or size, are entirely non-foveate and therefore generally indistinct (plane or flat or faint).

As regards the texture of the scars, "well foveate (w. fov.)," "foveo-cicatricial (fov. cic.)," plano-foveate (pl. fov.)," and "faintly or slightly foveate (f. fov.)" scars are all included in Class I. if their collective area reaches the required half-inch standard.

All "plane," "flat," "faint," "indistinct," and "non-foveate" scars are included in Class II. of indifferent vaccinations.

Class III.—"*Doubtfully vaccinated*" are (a) those persons reputed to have been vaccinated on reliable authority, but who on inspection bore no marks; and (b) others where the only information obtainable was hearsay evidence of a somewhat equivocal character.

Class IV.—"*Unvaccinated*" persons, *i.e.*, persons not vaccinated 14 or more days before the appearance of the eruption within the house. Cases of concurrent vaccinia and variola are dealt with on p. 45.

Class V.—Persons who, besides having been successfully vaccinated in infancy, were *successfully* "*Re-vaccinated*" once or more before exposure to the infection of small-pox. In the *uninfected* houses August 1st, 1892, is taken as the date. In the *infected* houses the operation must have been performed more than 14 days before the patient therein developed the eruption, and matured successfully. Individuals in this class are excluded from the other classes, except where it is expressly stated otherwise.

Class VI.—Those who have, on good evidence, had a *previous attack of small-pox.* This class is also excluded from the other classes.

The term "Vaccinated Persons" includes Classes I. II., and III. added together, so that the "Doubtfully" vaccinated are classed as vaccinated persons, although had we possessed sufficient information they might have been shown to belong to the unvaccinated group (Class IV.).

The figures, therefore, which refer to unvaccinated persons may be taken as quite reliable. If, after exhausting every possible means of inquiry there existed any doubt as to the unvaccinated condition, the person has been included in the doubtfully "vaccinated" class (Class III.).

Date.

The vaccinated condition of a household always bears reference to the date of the eruption the first case in the house. The actual cases of small-pox themselves were classed by their vaccinated state 14 days before they developed the eruption.

Value of evidence

The presence of characteristic scars on the upper arm was always regarded as indubitable evidence of successful vaccination. Of the hearsay evidence the most reliable was the mother's, then that of the other relatives and the doctor. It may be taken that a mother's affirmation "unvaccinated" was wholly reliable, but a mother's affirmation "vaccinated" was not always so.* It sometimes needed confirmation. The value of other evidence had to be judged by the kind of person, their opportunities for knowing, how they stood cross-examination, and other different qualities. The evidence of "the Doctor" was sometimes discounted by the fact that the eruption frequently hides the scars.

Confirmatory evidence was sought in all cases wherever the least doubt existed.

Size of marks.

The size of each vaccination mark inspected was always measured by a gauge and recorded by the Roman numerals. I.=·502 sq. inches, II.=·282 sq. inches, III.=·196 sq. inches, IV.=·126 sq. inches. Generally these have been worked out in the following tables, but in case they should not have been, it is useful to remember that:—

1 mark of size I. = ·502 inch.
2 marks „ II. = ·564 „
3 „ „ III. = ·588 „
and 4 „ „ IV. = ·504 „

are all just over the required standard of half a square inch total area.

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* The untraceable *cases* have been made available for calculation by the kindness of the Assistant Medical Officer of Health, in supplying particulars of these.

* *See* further remarks on this subject on p. 34, right-hand column.

Concerning those persons where reliable information, other than personal inspection, was obtainable as to their vaccination, the following expressions are used, "3 marks," "2, or 1, mark," or simply "marks." Persons reputed on good authority to bear three or more "marks" are placed in Class I. (well-vaccinated), those reported to have two marks or less are placed in Class II. (indifferently vaccinated). Most of those to whom the word "marks" is appended have, from the equivocal nature of the evidence, been included among the doubtful vaccinations (Class III.).

The best evidence of a previous attack of small-pox is extensive pitting on the face and elsewhere, but a less degree of pitting may occasionally result from varicella or acne. A circumstantial statement by a reliable person on the subject is of some value if small-pox was known to be prevalent at the time and in the place, and especially if other cases occurred in the same house at that time.

The instances which came under my notice were not sufficiently recent for me to derive any satisfaction by references to "doctors" or hospitals, though several attempts were made.

Types of small-pox.

As regards the type of small-pox, the cases are grouped into—

Class I.—*Mild* cases, modified, or so-called varioloid, where the eruption has been scanty, often abortive, and the constitutional symptoms slight or absent. Slight and very mild cases are here included.

Class II.—*Discrete* cases, where the eruption has been moderate in quantity, but the pocks have always matured, and the constitutional symptoms more or less marked. Semi-discrete and severe-discrete are classed as discrete.

Class III.—*Confluent* cases, where the eruption has been plentiful, and the pocks, at least on the face, running together; and the constitutional symptoms severe. Semi-confluent, Coherent, Conglomerate, Corymbose, Hæmorrhagic, and Malignant cases are included in this group.

The words "*fatality*" and "*case mortality*" are synonymous.

Age has reference to the completed age last birthday.

SECTION I.—CONDITION OF THE PEOPLE OF WARRINGTON IN 1892 AS REGARDS PRIMARY VACCINATION.

The arrangements for Vaccination are mentioned on pp. 17 and 20.

The Vaccination Officer informed me that there were no prosecutions for non-vaccination in the years 1891–3; and the people of Warrington are not as a whole, so far as I could ascertain, opposed to the practice of vaccination. In general terms it is a well vaccinated town.

Causes of non-vaccination.

Cases of omission to be vaccinated in infancy were very generally due to the removal of a child from the place of its birth during the first six months of its life. Under these circumstances the Vaccination Officer of Warrington does not receive any intimation, and it is only by chance that the child comes under the notice of the authorities at its new residence.

There does not seem to be at the present time any efficient process for following up such cases. Nothing is easier than thus to evade the vaccination laws; and there is no periodic examination of schools such as would discover these cases.

As regards the causes of non-vaccination in Warrington I found in very few instances that vaccination was postponed or not performed because of ailing health at the time when vaccination was due; in very rare instances there was objection on part of parents; and some children were reported insusceptible to vaccination (5 in 1890, 6 in 1891, and 6 in 1892). In the great majority of unvaccinated persons, passive negligence on the part of the parents was the cause of non-vaccination.

Vaccinated and revaccinated condition.

The result of our inquiries among the 3,394 persons living in a very representative district of the town shows that only ·8 per cent. of these had not undergone primary vaccination, excluding from this calculation persons known on good evidence to have previously had an attack of small-pox; and, on the other hand, that only 2·7 per cent. had been re-vaccinated, both calculations having reference to the virtual date of commencement of the epidemic, August 1st, 1892.

This Section will deal with:—

(*a.*) Vaccinated condition in the infected houses.
(*b.*) Vaccinated condition in a typical district of the town including both infected and uninfected houses.
(*c.*) Result of the Vaccination Officer's house-to-house inquiry.
(*d.*) Summary and comparison of (*a*) and (*b*).
(*e.*) Proportion of births to vaccinations (L. G. Bd. returns in Table VIII.).

Subsection a.—Vaccinated State in Infected Houses.

The table below (Table V.) shows the number and the condition, as regards vaccination of the inmates, at all and at certain ages, of the 437 infected houses before mentioned. The figures have reference in each infected house to the date when the inmate affected (or the first inmate if more than one was affected) developed the eruption.

An examination of this table shows amongst other points:—

1. That 4·2 per cent. of these 2,535 persons were unvaccinated at the time their houses were invaded by small-pox; 95·8 per cent. having been vaccinated, revaccinated, or protected by previous small-pox.

TABLE V.

VACCINATED CONDITION of 2,535 Persons living in 437 INFECTED HOUSES in which the Vaccinated State of both the Cases, and ALL THE OTHER INMATES, was ascertained by Personal Inquiry.

No. of Persons and Age-periods.	I. Well-vaccinated.		II. Indifferently Vaccinated.		III. Doubtful Vaccinations.		IV. Unvaccinated.		V. Revaccinated.		VI. Previously had Small-pox.	
Of 49 persons aged 60 and upwards there were - -	14	*28 per cent.*	21	*43 per cent.*	4	*8 per cent.*	1	*2 per cent.*	3	*6 per cent.*	6	*12 per cent.*
Of 127 persons aged 50–60 years there were - - -	38	*30* „	61	*48* „	9	*7* „	6	*4* „	4	*3* „	9	*7* „
Of 229 persons aged 40–50 years there were - - -	117	*51* „	76	*33* „	15	*7* „	5	*2* „	8	*3* „	8	*5* „
Of 286 persons aged 30–40 years there were - - -	131	*45* „	102	*36* „	20	*7* „	7	*2* „	12	*4* „	14	*5* „
Of 475 persons aged 20–30 years there were - - -	279	*58* „	140	*29* „	20	*4* „	14	*3* „	19	*4* „	3	*0·60* „
Of 681 persons aged 10–20 years there were - - -	460	*67* „	168	*25* „	16	*2* „	19	*3* „	17	*2* „	1	*0·14* „
Of 688 persons aged 0–10 years there were - - -	484	*70* „	133	*19* „	16	*2* „	55	*8* „	0	*0* „	0	*0·* „
Making a total of 2,535 persons of all ages - - - -	1,523	*60 per cent.*	701	*28 per cent.*	100	*4 per cent.*	107	*4 per cent.*	63	*2 per cent.*	41	*1·6 per cent.*

NOTE.—This table gives the actual numbers of persons, including both patients and their relatives, in ordinary type, and per-centages in italics.

2. That upwards of half (60 per cent.) of these 2,535 persons came into the well-vaccinated class;

that 28·0 per cent. showed indifferent vaccination,
that 4·0 „ „ doubtful „
that 4·2 „ were unvaccinated,
and that 2·4 „ had been revaccinated,

when their houses were invaded by small-pox.

3. That the largest proportion of the *well-vaccinated* persons were either under 10 years of age or between 10 and 20 years of age (70 and 67 per cent.), and that as age advanced the numbers of "well-vaccinated" became proportionally fewer.

4. That among the *indifferently and doubtfully* vaccinated, the age proportions work out in a converse direction though not with such marked differences.

Sub-section b.—Vaccinated Condition of the District around the old Hospital (Aikin Street).

Vaccinated condition in the Aikin Street district.

The Aikin Street district was a highly infected one. It is probable that most of the inhabitants were exposed to infection at some time during the epidemic.

This district of the town was a very representative one as regards size of house, number of inhabitants per house, and the occupations, habits, and mode of life of the people. The table below (Table VI.) prepared for me by Dr. W. E. Fielden gives the result of our house-to-house inquiry in that district, and shows the vaccinated condition of all the people living within 300 yards of the old Fever Hospital; those in the uninfected houses on August 1st, 1892, and those in the infected houses on the date when the patient developed the eruption.

An examination of this table shows, amongst other points, that all but 0·8 per cent. of these 3,394 persons were vaccinated, as compared with 4·2 per cent. unvaccinated in the infected houses in all parts of the town.

There were 3,116 persons in the uninfected houses, and 278 in the infected houses in this district. Of the former 0·74 per cent. were unvaccinated and of the latter 2·16 per cent. Persons who had previously had small-pox are excluded from both of these calculations.

Sub-section c.—Report of Vaccination Officer on vaccinated state of the town, December, 1892.

A house-to-house inquiry, without inspection of arms, was conducted in *November and December, 1892*, with great zeal by the Vaccination Officer and two assistants, in certain districts of the town.

His results differed somewhat from ours inasmuch as his inquiry had reference to a different period of time, and simple inquiry at the door failed, in some instances, to elicit the existence of an unvaccinated inmate, or to ascertain the quality of vaccination in others. Both infected and uninfected houses were visited. The Vaccination Officer has kindly supplied me with the following particulars.

The inquiry was carried on in the two chiefly infected districts of the town, viz.:—

Around old fever hospital.

(*a.*) Around the old fever hospital, comprising the greater part of Whitecross and St. Austin's wards, and a portion of the extra-parliamentary district of Sankey Bridges. This is an area which includes, but is larger than, the field of our last mentioned inquiries.

1,701 houses were visited, containing 7,664 persons; of whom—
7,641 (99·7 per cent.) were reported to be vaccinated.
23 (0·3 per cent.) were reported to be unvaccinated.
981 (12·8 per cent.) were reported to have been re-vaccinated at that date.*

Around n small-pox hospital.

(*b.*) Around the new small-pox hospital (Dallam Lane), comprising Bewsey ward and almost the whole of Orford ward.

1,657 houses were visited, containing 8,356 persons; of whom—
8,306 (99·4 per cent.) were reported as vaccinated.
50 (0·6 per cent.) were reported as unvaccinated.
789 (9·4 per cent.) were reported as revaccinated.*

Taking these two districts together—
3,358 houses were visited, containing 16,020 persons.†
15,946 (99·55 per cent.) were reported as vaccinated.
73 (00·45 „) „ unvaccinated.
1,770 (11·04 „) „ re-vaccinated.*

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* To end of December 1892.
† More than quarter of the population of Warrington.

TABLE VI.

SHOWING the VACCINATED CONDITION of 3,394 persons living in the 620 Uninfected and 43 Infected Houses within 300 yards of the Old Borough Hospital (**Aikin Street Area**). THE 93 RE-VACCINATED PERSONS HAVE BEEN INCLUDED IN THE FIRST TWO COLUMNS (I., II., AND III.), AS WELL AS IN COLUMN V.

Age periods.	I. Well Vaccinated.			II. and III. Indifferently and doubtfully Vaccinated.			IV. Unvaccinated.			V. Re-vaccinated.			VI. Previous Small-pox.		
	No. in Uninfected Houses.	No. in Infected Houses.	All Houses.	No. in Uninfected Houses.	No. in Infected Houses.	All Houses.	No. in Uninfected Houses.	No. in Infected Houses.	All Houses.	No. in Uninfected Houses.	No. in Infected Houses.	All Houses.	Persons in Uninfected Houses.	Persons in Infected Houses.	All Houses.
Of 78 persons aged 60 and upwards there were -	14	1	15	52	1	53	1	0	1	5	0	5	9	0	9
Of 145 persons aged 50–60 there were -	53	3	56	67	7	74	2	0	2	8	1	9	12	1	13
Of 263 persons aged 40–50 there were -	113	15	128	112	13	125	1	0	1	20	1	21	7	2	9
Of 456 persons aged 30–40 there were -	225	13	238	187	14	201	3	1	4	26	3	29	12	1	13
Of 566 persons aged 20–30 there were -	314	18	332	209	10	219	2	0	2	9	1	10	13	0	13
Of 796 persons aged 10–20 here were . -	504	66	570	193	24	217	2	0	2	13	4	17	7	0	7
Of 488 persons aged 5–10 there were -	331	28	359	113	11	124	3	2	5	2	0	2	0	0	0
Of 504 persons aged 1–5 there were -	356	24	380	108	10	118	4	2	6	0	0	0	0	0	0
Of 98 persons aged under 1 there were -	63	5	68	19	5	24	5	1	6	0	0	0	0	0	0
Of 3,394 persons at all ages there were -	1,973	173	2,146	1,060	95	1,155	23	6	29	83	10	93	60	4	64

NOTE.—The 620 uninvaded houses contained 3,116 inmates. The 43 invaded houses contained 278 inmates. The term "invaded" or "infected" means here infected with small-pox prior to October 4th, 1892, 15 days after the patients were shifted to the New Hospital. 5·0 persons per house in uninfected houses, 6·4 persons per house in infected houses.

Sub-section d.—Summary.

The table below (Table VII.) shows at once the result of my two inquiries, for comparison.

If, as I believe, the Aikin Street area may be regarded as a sample of the vaccinated condition of the whole town—

63·2 per cent. of the inhabitants of the town were well vaccinated (primarily);
34·0 per cent. indifferently and doubtfully vaccinated (primarily), including, as pointed out on p. 22, some who might have turned out to be unvaccinated;
0·8 per cent. were unvaccinated; and
1·9 per cent. had previously had small-pox;

at the date to which my inquiries on these points had reference (August 1st, 1892).

And, finally, that 2·7 of the inhabitants had been re-vaccinated prior to that date. This figure has to be modified for the town generally (p. 43).

Sub-section e.—Proportion of Public Vaccinations to Births per Annum.

The table below (Table VIII.) shows the number of births compared with the number of vaccinations done each year from 1872 to 1892 inclusive, from the Local Government Board returns.

The per-centage of the births in the Warrington Union which remain unaccounted for each year is small.

TABLE VII.

GIVING a SUMMARY of the two Inquiries into the Vaccinated State of the Borough of Warrington (1892).

—	Well vaccinated.		Indifferently vaccinated.		Doubtful vaccinations.		Unvaccinated.		Re-vaccinated.		Previously had Small-pox.	
	Number of Persons.	Per cent.	Number of Persons.	Per cent.	Number of Persons.	Per cent.	Number of Persons.	Per cent.	Number of Persons.	Per cent.	Number of Persons.	Per cent.
A.*—2,535 persons in 437 infected houses, scattered all over the town (personal inquiry), Table V.	1,523	*60·0*	701	*27·6*	100	*3·9*	107	*4·2*	63*	*2·5*	41	*1·6*
B.†—3,394 persons in {43 infected houses, 620 uninfected houses} situated within 300 yards radius of the old fever hospital (Aikin Street) (personal inquiry), Table VI.	2,146	*63·2*	1,155	*34·0*	Included in preceding column.		29	*0·8*	93‡	*2·7*	64	*1·9*

* On the date when the first patient in the house developed the small-pox eruption.
† On August 1st, 1892.
‡ These persons are also included in the first two columns.

TABLE VIII.

Particulars of BIRTHS REGISTERED and VACCINATIONS PERFORMED in the WARRINGTON UNION during the 21 years 1872–1892. The Union includes but is larger than the Borough (p. 82).*

Year.	Births registered during Year.	Of the Children whose Births were registered during the Year given in the First Column, by the 31st January in the Year next but one following that Year there were:—						
		Successfully Vaccinated.	Certified as insusceptible of Vaccination.	Had Small-pox.	Died Unvaccinated.	Vaccination postponed by Medical Certificate.	Remaining.	The Children not finally accounted for (including Cases postponed) being per cent. of Births.
1872	2,217	1,882	12	2	204	116		5·2
1873	2,343	1,762	1	0	181	8	391	17·0
1874	2,481	2,185	2	1	251	12	30	1·7
1875	2,508	2,209	0	0	236	17	46	2·5
1876	2,704	2,400	0	0	232	21	51	2·7
1877	2,670	2,320	2	0	208	32	108	5·2
1878	2,710	2,268	1	0	263	35	143	6·6
1879	2,770	2,337	2	0	275	33	123	5·6
1880	2,826	2,311	0	0	317	56	142	7·6
1881	2,841	2,334	1	0	314	30	162	6·8
1882	2,819	2,268	0	0	332	16	203	7·8
1883	2,976	2,369	7	0	359	114	127	8·1
1884	3,021	2,527	4	0	398	20	72	3·0
1885	2,869	2,470	1	0	276	34	88	4·3
1886	2,904	2,456	6	0	338	19	85	3·6
1887	2,936	2,482		0	331	24	96	4·1
1888	2,973	2,484	1	0	298	26	164	6·4
1889	3,055	2,573	4	0	296	28	154	6·0
1890	3,074	2,597	5	0	315	13	144	5·1
1891	3,334	2,835	13	0	354	20	112	4·0
1892	3,331	2,889	5	0	321	20	96	3·5

NOTE.—* These particulars are from the Local Government Board returns.

SECTION II.—HAD PRIMARY VACCINATION ANY POWER TO PROTECT FROM INFECTION.

A distinction is here drawn between the power, if it exist, of efficient vaccination to protect from the infection of small-pox (Section II.), and its power, if any, to modify the disease when once contracted (Section III.).

The question of PROTECTION may be approached by investigating—

- (*a.*) The relative proportion of unvaccinated persons in the infected and uninfected houses respectively.
- (*b.*) The relative vaccinated condition of the vaccinated persons in the infected and uninfected houses respectively.
- (*c.*) The different proportions of persons attacked among the several vaccinated states dwelling in the infected houses.
- (*d.*) Similar facts as regards a typical district of the town.
- (*e.*) A comparison of an outbreak of small-pox in a vaccinated and unvaccinated community.

Sub-section a.—Proportion of Unvaccinated Persons in Infected and Uninfected Houses respectively.

In the preceding section we saw (Table V., *ante*) that 4·2 per cent. of the 2,535 dwellers in the 437 houses invaded by small-pox were unvaccinated persons. But as a result of our house-to-house inquiry (Table VI., *ante*) in the Aikin Street district, which comprised 43 infected houses and 620 uninfected houses, we found that only 0·8 per cent. of the 3,394 inhabitants were unvaccinated. This is a large difference (five times), but it becomes still more remarkable when one finds, on examining the 620 uninfected houses alone, that only 0·74 per cent. of the 3,116 inmates were unvaccinated.

Sub-section b.—Comparison of Vaccinated Condition in Infected and Uninfected Houses.

The table given below (Table IX.) shows the relative vaccinated condition in infected or uninfected houses respectively, extracted from the figures given in Tables V. and VI.

These figures are strictly comparable in all respects, the houses and the inmates were living practically under the same conditions.* The only material differences being—

- (i) that Class B. contains a larger proportion of well-vaccinated persons, and of indifferently and doubtfully vaccinated persons, and a smaller proportion of unvaccinated than class A., and
- (ii) that the houses included in Class A. were invaded by small-pox; while those in Class B. were not.

Sub-section c.—The relative Proportions of Persons attacked among the several Vaccinated Groups of People in the Infected Houses.

Relation small-pox to vacci- nated stat in infecte houses.

The possibility or impossibility of vaccination to protect from the infection of small-pox may best be studied by a critical examination of the vaccinated state of all persons similarly exposed to the infection of small-pox, and comparing the "attack-rate" in the different groups. Now, bearing in mind the social class affected with small-pox, and their habits of life, it may be taken as nearly certain that all the inmates of an infected house were exposed in some degree to infection, either before or after recognition of the disease; either from the patient, or from the same source as the patient.

Table X., next page, shows that in the 437 infected houses there were 2,387 persons who were classed as having been vaccinated at some time of their lives before the house became infected, and of these 553 or *23 per cent.* were attacked with small-pox. Included in this calculation are 100 persons about whose vaccination I was unable to satisfy myself. On the information before me some of them might or might not have been vaccinated (p. 22): 25 of the cases arose amongst them.

In the same houses were found 107 unvaccinated persons, and of these 60 or *56 per cent.* were attacked with small-pox.

I could ascertain no reason for this remarkable difference in the attack-rate in the two classes, unless the fact of vaccination protected the vaccinated persons from being attacked by small-pox. Being members of the same families, they lived in the same houses (which, be it noted, were of a remarkably uniform type), ate the same food, often did the same work, and were exposed to the same hereditary and external influences. But the one class was vaccinated and had a small-pox attack-rate of 21 and the other was unvaccinated and had an attack-rate of 56.

But let us inquire more particularly into the quality of the vaccination in the infected houses, as defined on p. 22, and see whether different qualities of vaccination afforded different degrees of protection from infection. The table on next page (Table X.), giving the actual number of persons, is the outcome of my investigations in this subject.

It may be taken that all these persons were exposed, and in general terms pretty equally exposed, to the infection of small-pox. It will be seen from this table:—

TABLE IX.

A COMPARISON of the VACCINATED CONDITION of PERSONS in INFECTED and UNINFECTED HOUSES respectively. (Result of Personal Inquiry.)

—	Well Vaccinated Persons.		Indifferently and Doubtfully Vaccinated Persons.		Unvaccinated Persons.		Persons who had previously had Small-pox.	
A.—There were 2,472 persons (excluding 63 re-vac.) in the 437 *infected* houses, situated in different parts of the town (see Table V., *ante*), of whom	1,523	61·6 per cent.	801	32·4 per cent.	107	4·3 per cent.	41	1·6 per cent.
B.—There were 3,116 persons in the 620 *uninfected* houses, situated in the Old Fever Hospital District (see Table VI., *ante*), of whom - -	1,973	63·3 per cent.	1,060	34·0 per cent.	23	0·7 per cent.	60	1·9 per cent.

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* With the exception of number of inmates per house *vide* Part IV. of this Report, p. 81.

1. That the proportion of those attacked among the indifferently and doubtfully vaccinated is higher than that among the well-vaccinated.
2. That the number attacked among the unvaccinated is more than twice as great as the doubtfully vaccinated group; and
3. That a larger proportion were attacked amongst those who had had small-pox previously than amongst the re-vaccinated (12 and 11 per cent. respectively).

Sub-section d.—The Attack Rates among the Vaccinated and Unvaccinated in a representative District in the Town.

Table XI., given below, shows the relative incidence of small-pox on the vaccinated and the unvaccinated at different age periods in the highly infected area near the old Borough Fever Hospital.

It will be seen that the attack rate was heavier, and the class of case more severe, among the unvaccinated than it was among the vaccinated.

Sub-section e.—Comparison of a Vaccinated with an Unvaccinated Community.

Attack rate in an unvaccinated community.

A comparison of this epidemic with one in the same community before vaccination was practised will be found in Section IV. (p. 36 *et seq.*), which deals with the historical prevalence of small-pox in Warrington in former years. In *Sub-section c* (p. 39) of that Section it will be seen—

1. That the "attack rates" in the unvaccinated (1773) and vaccinated (1892) communities differ as 64 per 1,000 and 12 per 1,000 respectively.
2. That whereas the disease was endemic in the unvaccinated community it is only epidemic in the (almost entirely) vaccinated community; and
3. That the average number of deaths from small-pox in practically unvaccinated Warrington, 1773 to 1842, was 35 per annum (*i.e.*, taking those years of which a record exists, p. 41); and in vaccinated (*i.e.*, in general terms) Warrington, 1843–1891, was 5·6 per annum. The population had meantime grown from 8,000 to 52,000 (p. 40).

As regards Warrington in the present day, out of 2,535 persons dwelling in 437 *infected houses*, of whom 2,324 had been vaccinated once in their lives, and 107 had never been vaccinated, the attack rate amongst the former was 235 per 1,000 and among the latter 561 per 1,000. (Table X., below.)

Finally, in the highly *infected district*, the Aikin Street area (Table XI., below), out of 3,301 vaccinated persons dwelling in that area 26 per 1,000 were attacked, and out of 29 unvaccinated persons 207 per 1,000 were attacked.

TABLE X.

AN ANALYSIS of the Population in 437 INFECTED HOUSES as regards the quality of their Vaccination and the Number of Persons attacked in the respective Groups.*

——	Well Vaccinated.	Indifferently. Vaccinated.	Doubtful Vaccinations.	Unvaccinated.	Re-vaccinated.	Had Small-pox previously.
2,535 persons in 437 infected houses -	1,523	701	100	107	63	41
Of whom 618 persons were attacked by small-pox.	329	192	25	60	7	5
Per-centage of persons attacked -	*21·6 per cent.*	*27·4 per cent.*	*25·0 per cent.*	*56·1 per cent.*	*11·1 per cent.*	*12·2 per cent.*
58 deaths - - - -	10	17	10	21	0	0
Case Mortality (per cent.) (Table, p. 49)	*3·0 per cent.*	*8·8 per cent.*	*40·0 per cent.*	*35·0 per cent.*	*0·0 per cent.*	*0·0 per cent.*

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* The Workhouse, Fever Hospital, Common Lodging Houses, and a few houses whose inmates could not be traced, are excluded from this calculation as it was not possible to obtain the facts as to vaccination of the other inmates in these, with the same degree of accuracy as in the remaining 437 houses, p. 22.

It will be observed that the case-mortality among the doubtfully vaccinated and the unvaccinated is very heavy, though both approximate to Marson's unvaccinated fatality (37 per cent.) based on 2,654 cases (Reynold's system, Vol. I., p. 238). The heavy mortality among the doubtfully vaccinated appears to be due partly to the drinking habits of the inhabitants, and partly to the circumstance that many were probably unvaccinated persons.

TABLE XI.

RELATIVE NUMBER of SMALL-POX CASES amongst (*a.*) the vaccinated (including doubtful vaccinations and re-vaccinations, but excluding previous Small-Pox), and (*b.*) the unvaccinated persons, respectively, in a highly infected area, viz., the 300 yards AIKIN STREET AREA.

——	Persons protected by Vaccination in 300 yards Aikin Street area.								Unvaccinated people in 300 yards Aikin Street area.							
	60 and older.	50-60	40-50	30-40	20-30	10-20	0-10	All Ages.	60 and older.	50-60	40-50	30-40	20-30	10-20	0-10	All Ages.
No. of people in area - - - -	68	130	253	439	551	787	1,073	3,301	1	2	1	4	1	3	17	29
Mild cases - - - - - -	2	2	2	7	15	16	7	51	0	0	0	0	0	0	0	0
Discrete cases - - - - -	0	1	0	5	6	10	1	23	0	0	0	0	0	1	1	2
Confluent cases - - - -	0	0	2	2	5	1	0	10	0	0	0	0	0	2	2	4
Total cases - - - - -	2	3	4	14	26	27	8	84	0	0	0	0	0	3	3	6
Deaths - - - - - - -	0	0	2	0	0	0	0	2	0	0	0	0	0	1	2	3

NOTE.—The vaccinated state of the people refers to August 1st, 1892. The cases are those which arose in that district between August 1st and October 4th, 1892.

SECTION III.—HAD PRIMARY VACCINATION ANY POWER TO MODIFY THE SEVERITY AND FATALITY OF SMALL-POX?

Sub-section a.—The Types of Case and Fatality occurring among the Vaccinated and Unvaccinated respectively.

Severity.

It will be seen from Table XII. at foot that,—

Out of 586 *primarily vaccinated* cases 321 were mild, 137 discrete, and 128 confluent;

Out of 68 *unvaccinated* cases 3 were mild, 17 discrete, and 48 confluent.

Thus 22 per cent. of the vaccinated cases (including 12 doubtfully vaccinated persons) were confluent, and 70 per cent. of the unvaccinated were confluent.

Case mortality.

Amongst the 667 cases which occurred between May 10, 1892, and May 10, 1893, 62 were fatal, giving a case-mortality of 9·3 per cent.

Out of 586 vaccinated and doubtfully vaccinated cases 38 were fatal; case-mortality, 6·5 per cent. (8 re-vaccinated and five previous small-pox cases are omitted).

Out of 68 unvaccinated cases 24 were fatal; case-mortality, 35 per cent.

Thus the case-mortality among the unvaccinated is five and a half times as great as that amongst the vaccinated.

Sub-section b.—The Type of Case and Fatality occurring among the different Classes of Vaccinated Persons.

It will be seen from Tables XII. and XIII. that as the vaccinated condition was less perfect (as measured by current standards), so in proportion the cases were more severe.

Out of the 350 well-vaccinated cases—
60 per cent. were mild,
23 „ „ discrete, and
17 „ „ confluent.
2·9 „ *died.*

Out of the 208 indifferently vaccinated cases—
56 per cent. were mild,
22 „ „ discrete, and
22 „ „ confluent.
8·2 „ *died.*

Out of the 28 doubtfully vaccinated cases—
43 per cent. were mild,
14 „ „ discrete, and
43 „ „ confluent.
39·0 „ *died.*

As regards the fatality of the disease—

I.—Case mortality in well-vaccinated cases, 2·9 per cent.

II.—Case mortality in indifferently vaccinated cases, 8·2 per cent.

III.—Case mortality in doubtfully vaccinated cases, 39·3 per cent.

IV.—Case mortality in unvaccinated cases, 35·3 per cent.

It follows therefore from the foregoing :—

(1.) That small-pox as it occurred amongst the WELL-VACCINATED was 3 times less fatal than amongst those who were indifferently vaccinated, 13 times less fatal than amongst the doubtfully vaccinated; and 12 times less fatal than amongst the unvaccinated.

(2.) That the disease as it occurred among the INDIFFERENTLY VACCINATED was 4½ times less fatal than amongst the doubtfully vaccinated; and 4 times less fatal than amongst the unvaccinated.

(3.) That the disease as it occurred amongst persons classed as *doubtful vaccinations* (definition, page 22), was rather more fatal than amongst the unvaccinated.

(4.) And finally, that the disease as it occurred amongst the *vaccinated cases*, including those classed as *doubtful* vaccinations, was 5½ times less fatal than it was amongst the *unvaccinated.*

The fatality at different age periods is given in Table XVII., p. 35.

TABLE XII.

AN ANALYSIS of the different types of 667 SMALL-POX CASES occurring in the different VACCINATION GROUPS.

—	Mild Cases.	Discrete Cases.	Confluent Cases.	Totals.	Deaths.	Case Mortality.
350 well-vaccinated cases (Class I.) - - -	205	83	62	350	10	*2·9*
208 indifferently vaccinated (Class II.) - -	104	50	54	208	17	*8·2*
28 doubtful vaccinations (Class III.) - - -	12	4	12	28	11	*39·3*
68 unvaccinated cases (Class IV.) - - -	3	17	48	68	24	*35·3*
8 successfully re-vaccinated cases (Class V.) - -	2	4	2	8	0	*0*
5 cases had had small-pox previously (Class VI.) -	3	2	0	5	0	*0*
Totals - - - - -	329	160	178	667	62	*9·3*
Number of deaths in each type of case - -	0	3	59	62	—	—
Per-centage fatality in each type of case - -	*0*	*1·87*	*33·14*	*9·3*	—	—

Case-mortality amongst vaccinated and doubtfully vaccinated persons = 6·4 per cent.
„ „ unvaccinated = 35·2 per cent.

TABLE XIII.

AN ANALYSIS of the Proportion of the different VACCINATION GROUPS occurring in each type of the 667 CASES of SMALL-POX.

—	A. Mild Cases of Small-Pox, 29.						B. Discrete Cases of Small-Pox, 160.						C. Confluent Cases of Small-Pox, 178.						D. Fatal Cases of Small-Pox, 62.					
	Vaccinated State.						Vaccinated State.						Vaccinated State.						Vaccinated State.					
	I.*	II.	III.	IV.	V.	VI.	I.	II.	III.	IV.	V.	VI.	I.	II.	III.	IV.	V.	VI.	I.	II.	III.	IV.	V.	VI.
Cases - -	205	104	12	3	2	3	83	50	4	17	4	2	62	54	12	48	2	0	10	17	11	24	0	0
Per-centages -	62·3	31·7	3·6	0·9	0·6	0·9	51·9	31·2	2·5	10·6	2·5	1·2	34·8	30·3	6·7	26·9	1·1	0·0	16·1	27·4	17·7	38·7	0	0

* The Roman numerals indicate the various vaccinated classes as defined on p. 22, *ante.* I. "Well-vaccinated." II. "Indifferently vaccinated." III. "Doubtfully vaccinated." IV. "Unvaccinated." V. "Re-vaccinated." VI. "Previously affected with small-pox."

TABLE XIV.

GIVING PARTICULARS concerning all the VACCINATED Persons, 38 in number, who were certified to have DIED OF SMALL-POX May 10, 1892—May 10, 1893.

Book Reference.	No. of Case.	Residence.	Name.	Sex.	Age at Death.	Occupation.	Date of					Attack.		Primary Vaccination.			Revaccination.		Evidence as to Vaccination.	Previous Health.	Complications and Remarks.
							Notification.	Onset.	Rash.	Removal to Hospital.	Termination.	Type.	Result.	Date.	Marks.		Date.	Result.			
															No.	Character.					
XI./1	12	17, Winwick Road -	A——, John -	M.	31	Brewer's labourer.	Aug. 24	Aug. 18	Aug. 22	Aug. 24	Aug. 30	Confluent	Died at Aiken Street Hospital.	Infancy	2	—	Never	—	Mother's evidence	Good - -	——
II./3	79	Ice Cottage, Heath Side.	L——, Peter -	M.	20	Fish salesman	Sept. 22	Sept. 18	Sept. 23	Sept. 22	Oct. 1	Confluent	Died at Hope Hospital.	Doubtful.	—	—	—	—	See Remarks on p. 34.	„ - -	Delirium.
II./3	75	„ „	L——, James -	M.	8	School -	Sept. 22	Sept. 18	Sept. 20	Sept. 22	Sept. 29	Confluent	Died at Hope Hospital.	Infancy	—	—	—	—	See Remarks on p. 34.	„ - -	——
I./9	51	14, New Road -	D——, Samuel -	M.	58	File cutter -	Sept. 12	Sept. 7	Sept. 10	Sept. 20	Sept. 25	Confluent	Died at Hope Hospital.	Infancy	3	Good marks.	Never	—	Mother and daughter's evidence.	Said never to have been a strong man; much emaciated.	——
IV./6	96	48, Aikin Street -	Y——, Martha -	F.	27	Fustian cutter.	Sept. 27	Sept. 23	Sept. 25	Sept. 26	Oct. 7	Confluent	Died at Hope Hospital.	Infancy	3	—	Never	—	Mother's evidence	Said to be weak with grief for loss of husband, and nursing an infant five months old at time of death.	——
XIV./8	98	14, Cockhedge Lane	C——, Margaret	F.	39	Housewife -	Sept. 28		Sept. 25	Sept. 28	Oct. 6	Confluent	Died at Hope Hospital.	Infancy	2	Small marks.	Never	—	Nurse and daughter's evidence.	Very alcoholic, and had had delirium tremens; lived in an overcrowded house.	——
XIV./8	112	„ „	C——, Edward -	M.	40	Ironworker -	Sept. 30		Sept. 30	Sept. 30	Oct. 10	Confluent	Died at Hope Hospital.	Infancy	2	Small marks.	Never	—	Nurse and daughter's evidence.	Ditto ditto	——
VIII./7	117	17, Turner Street -	E——, Thomas -	M.	18	Hawker -	Oct. 1	Sept. 27	Sept. 28	Oct. 1	Oct. 27	Discrete	Died at Hope Hospital.	Infancy	3	Good marks.	Never	—	Doctor's evidence	No information -	Died one month after onset of small-pox, and death certificate gives, as secondary cause, pyæmia.
VI./20	144	78, Howard Street -	W——, George -	M.	46	Wireworker -	Oct. 7	Oct. 2	Oct. 6	Oct. 7	Oct. 13	Confluent	Died at Hope Hospital.	Infancy	4	Good marks.	Never	—	Wife's evidence -	Stated to be a sober man.	Hospital stated to be very crowded at the time.
X./26	177	2, Philip Street -	M——, Martha -	F.	36	Grocer's shop	Oct. 16	Oct. 14	Oct. 15	Oct. 16	Oct. 21	Confluent	Died at Hope Hospital.	Infancy	3	Good marks.	Never	—	Eldest daughter -	Reputed sober.	——
XI./10	184	341, Winwick Road	H——, Jane -	F.	32	House-work -	Oct. 17	Oct. 13	Oct. 15	Oct. 17	Oct. 23	Confluent	Died at Hope Hospital.	Infancy	2	Good marks.	Never	—	Doctor and husband's evidence.	Reputed sober.	Suffering from "septicæmia after miscarriage," death certificate.

Table XIV.—*continued*.—GIVING PARTICULARS concerning all the VACCINATED Persons, 38 in number, who were certified to have DIED OF SMALL-POX May 10, 1892—May 10, 1893.

Book Reference.	No. of Case.	Residence.	Name.	Sex.	Age at Death.	Occupation.	Date of					Attack.		Primary Vaccination.			Revaccination.		Evidence as to Vaccination.	Previous Health.	Complications and Remarks.
							Notification.	Onset.	Rash.	Removal to Hospital.	Termination.	Type.	Result.	Date.	Marks.		Date.	Result.			
															No.	Character.					
X. 30	186	4, Blue Coat Street	H——, William	M.	36	Journeyman tool maker.	Oct. 17	Oct. 13	Oct. 16	Never	Oct. 17	Hæmorrhagic.	Died at home	Infancy	2	Faint marks	Never	—	Wife's evidence	Teetotaler.	——
X. 26	190	2, Philip Street	M——, Joseph	M.	34	Journeyman wire drawer.	Oct. 18	Oct. 14	Oct. 16	Never	Oct. 18	Malignant.	Died at home	Infancy	3	—	Never	—	Eldest daughter and mother-in-law who nursed him.	Reputed sober.	——
XII. 30	191	23, Portland Street	B——, Thomas	M.	31	Contractor's carter.	Oct. 18	—	Oct. 17	Oct. 18	Oct. 25	Confluent	Died at Hope Hospital.	Infancy	2	Good marks.	Never	—	Doctor and mother-in-law.	Drank heavily.	——
VIII. 21	202	10, Orford Lane	C——, Elizabeth	F.	30	Housewife	Oct. 20	Oct. 17	Oct. 19	Oct. 20	Oct. 27	Confluent	Died at Hope Hospital.	Infancy	1	Faint mark.	Never	—	Doctor	Reported a very delicate woman.	——
XI. 27	209	154, Winwick Road	B——, James	M.	27	Gas stoker	Oct. 22	Oct. 15	Oct. 20	Oct. 22	Oct. 25	Confluent	Died at Hope Hospital.	Infancy	2	"Large marks."	Never	—	Sister-in-law	Teetotaler; reported to have had "feverish" attacks two or three times a year in which he used to ramble.	——
IV. 19	232	115, Bostock Street	A——, William	M.	41	Book keeper at wire works.	Oct. 28	—	Oct. 26	Oct. 28	Nov. 9	Confluent	Died at Hope Hospital.	Infancy	1	Faint mark.	Never	—	Aunt with whom he lived and doctor.	After ailing.	——
XIII 32	240	18, Ellis Street	W——, Barbara	F.	21	Housework	Oct. 31	Oct. 28	Oct. 30	Oct. 31	Nov. 6	Confluent	Died at Hope Hospital.	Infancy	2	Good marks.	Never	—	Evidence of doctor.	Heart disease following acute rheumatism nine years ago.	——
II. 23	245	Tanner's Lane	N——, Peter	M.	44	Cooper	Oct. 31	Oct. 31	Oct. 31	Oct. 31	Nov. 7	Confluent	Died at Hope Hospital.	Infancy	—	"Marks"	Never	—	Daughter and sister-in-law.	Had drank heavily for years.	——
I. 5	265	Frederick Street	H——, Sarah	F.	23	Housewife	Nov. 5	Oct. 29	Nov. 5	Neve	Nov. 21	Discrete	Died at home	Infancy	3	Good marks.	Never	—	Doctor and mother	Pneumonia, October 21st; confined, November 3rd; small-pox, November 5th.	——
XV. 21	322	62, Wellington Street.	G——, George	M.	20	Pawnshop Apprentice.	Nov. 10	Nov. 3	Nov. 6	Never	Nov. 15	Confluent	Died at home	Infancy	2	"Small marks."	Never	—	Mother	Healthy.	——
VIII. 25	304	24, Pinners Brow	W——, John	M.	22	Engine tenter	Nov. 9	Nov. 4	Nov. 7	Nov. 9	Nov. 15	Confluent	Died at Hope Hospital.	Infancy	2	—	Never	—	Mother's evidence	Healthy.	——
XI. 20	314	80, Longford Street	A——, Jabez	M.	42	Foreman shunter.	Nov. 10	Nov. 5	Nov. 7	Nov. 14	Nov. 19	Confluent	Died at Hope Hospital.	Infancy	3	Good marks.	Never	—	Doctor and wife	Alleged intemperance.	——
VII. 6	324	62, Selby Street	S——, Alfred	M.	28	Journeyman blacksmith.	Nov. 10	Nov. 6	Nov. 9	Never	Nov. 15	Confluent	Died at home	Infancy	2	Small marks.	Never	—	Sister and ? doctor	Unknown	Unknown.
IX. 3	344	77, Chorley Street	E——, James	M.	36	Engine-driver at forge.	Nov. 12	Nov. 6	Nov. 9	Never	Nov. 17	Confluent	Died at home	Infancy	2	Good marks.	Never	—	Sister-in-law	Reputed steady.	——
XII. 12	365	3, Appleton Street	S——, Percy	M.	26	Boiler-maker	Nov. 16	Nov. 5	Nov. 10	Nov. 15	Nov. 20	Confluent	Died at Hope Hospital.	Infancy	2	Good marks.	Never	—	Doctor and mother	Drank heavily till within 12 months.	——

Table XIV.—*continued.*—Giving Particulars concerning all the VACCINATED Persons, 38 in number, who were certified to have DIED OF SMALL-POX May 10, 1892—May 10, 1893.

Book Reference.	No. of Case.	Residence.	Name.	Sex.	Age at Death.	Occupation.	Date of					Attack.		Primary Vaccination.			Re-vaccination.		Evidence as to Vaccination.	Previous Health.	Complications and Remarks.
							Notification.	Onset.	Rash.	Removal to Hospital.	Termination.	Type.	Result.	Date.	Marks.		Date.	Result.			
															No.	Character.					
XI. 5	341	133, Winwick Road	G——, Sarah -	F.	36	Housework -	Nov. 11	Nov. 7	Nov. 11	Nov. 15	Nov. 19	Confluent	Died at Hope Hospital.	Infancy	3	Good marks.	Never	—	Doctor and husband.	Reputed weakly and ailing.	——
II. 13	377	6, Mill Street -	L——, James -	M.	46	Hawker -	Nov. 17	Nov. 13	Nov. 16	Nov. 18	Dec. 4	Confluent	Died at Hope Hospital.	Infancy	2	Very faint marks.	Never	—	Doctor and daughters.	Reputed not healthy; had formerly been in an asylum for 10 months.	——
XIII. 9	388	44, Pierpoint Street	M——, William	M.	31	Ironworker -	Nov. 21	Nov. 17	Nov. 20	Nov. 22	Nov. 29	Confluent	Died at Hope Hospital.	Infancy	2	Good marks.	Never	—	Doctor and mother	Reputed sober and healthy.	——
XIV. 15	413	79, Buttermarket, Street.	E——, George -	M.	39	Stonemason -	Nov. 29	Nov. 26	None	Never	Nov. 29	Very malignant.	Died at home	Infancy	1	—	Never	—	Wife and sister-in-law.	Reputed to be a great sufferer from chronic bronchitis.	——
I. 7	433	3, St. Mary Street -	A——, John -	M.	39	Book-keeper -	Dec. 12	Nov. 29	Dec. 1	Never	Dec. 12	Confluent	Died at home -	Infancy	1	Faint mark.	Never	—	Wife and sister -	Reputed healthy and sober.	——
IX. 4	468	79, Chorley Street -	G——, Sarah -	F.	62	Housework -	Dec. 14	Dec. 9	Dec. 11	Dec. 14	Dec. 18	Confluent	Died at Hope Hospital.	Infancy	3	Very faint non. fov.	Never	—	All information concerning this case derived from Assistant Medical Officer of Health.	——	——
V. 6	473	Workhouse, Guardian Street.	T——, James -	M.	42	General labourer.	Dec. 19	—	Dec. 19	Dec. 19	Dec. 21	Confluent	Died at Hope Hospital.	Infancy	3	Good marks.	Never	—	Wife - -	Advanced pulmonary phthisis was real cause of death.	——
XVIII. 2	550	31, Factory Lane -	A——, James -	M.	49	Assistant foreman.	Feb. 21	—	Feb. 19	Feb. 21	Feb. 23	Confluent	Died at Hope Hospital.	Infancy	2	—	Never	—	Death certificate -	Alcoholic.	——
XIX. 30	554	14, King Street -	B——, John -	M.	35	Cab-driver -	Feb. 25	—	—	Feb. 25	Feb. 26	Malignant.	Died at Hope Hospital.	Infancy	1	Fov. IV.	Never	—	Assistant Medical Officer of Health.	Alcoholic - -	Died really of delirium tremens.
XVIII. 19	607	54, Pierpoint Street	M——, John -	M.	9	School - -	April 6	April 1	April 4	April 6	April 21	Confluent	Died at Hope Hospital.	Infancy	3	Small marks.	Never	—	Mother's evidence and copy of vaccination certificate from Penrith.	Was ill with inflammation of lungs and bowels at time of contracting disease.	Broncho-pneumonia.
XIX. 12	636	103, Winwick Road -	T——, Arthur -	M.	40	Engine-fitter -	April 26	April 24	April 26	April 26	April 27	Malignant.	Died at Hope Hospital.	Infancy	2	Faint marks.	Never	—	Death certificate and mother.	Reputed sober.	——
XVIII. 10	640	93, Cartwright Street.	H——, Elizabeth	F.	24	Housework -	April 28	April 24	April 26	April 28	May 6	Confluent	Died at Hope Hospital.	Infancy	2	Very plain marks.	Never	—	Death certificate -	Delicate -	Was suckling a child 18 months old, and milk ceased suddenly on admission to hospital.

TABLE XV.

GIVING PARTICULARS of all the UNVACCINATED PERSONS, 24 in number, who were certified to have DIED OF SMALL-POX, May 10, 1892 to May 10, 1893.

Book Reference.	No. of Case.	Residence.	Name.	Sex.	Age at Death.	Occupation.	Date of					Attack.		Evidence as to Vaccination.	Previous Health and Vaccination.	Complications and Remarks.
							Notification.	Onset.	Rash.	Removal to Hospital.	Termination.	Type.	Result.			
III. 1	1	Lodging house, Friar's Green.	R——, William	M.	27	Navvy	July 28	—	July 26	July 28	Aug. 5	Confluent	Died in Aiken Street Hospital.	Death certificate and brother.	Reputed intemperate.	Delirium.
VI. 6	10	8, Howard Street	B——, Henry	M	10	School	Aug. 23	Aug. 14	Aug. 17	Aug. 23	Aug. 26	Confluent	" "	Death certificate and mother.	Good.	—
VI. 13	19	42, Howard Street	M——, James	M.	20 days		Sept. 2	Aug. 29	Aug. 30	Never.	Sept. 6	Confluent	Died at home	Death certificate and mother.	"	—
XIII. 33	157	21, Allcard Street	G——, Robert	M.	1 month		Oct. 10	Oct. 8	Oct. 8	Oct. 10	Oct. 12	Confluent	Died at Hope Hospital.	Mother	"	—
II. 17	182	2, Foundry Street	M——, Alice	F.	10 days		Oct. 16	Oct. 11	Oct. 14	Oct. 17	Oct. 21	Confluent	Died at Hope Hospital.	Mother and father	Vaccinated October 11th on day of onset.	—
XIII. 7	260	36, Pierpoint Street	M——, Sarah	F.	8	School	Nov. 4	—	Oct. 20	Never.	Nov. 3	Confluent	Died at home	Mother and father	Unknown	This case was concealed and neglected by the parents, and was the subject of a coroner's inquest. Verdict "Death from "small-pox accelerated by neglect."
IX. 15	225	18, Forshaw Street	C——, Eliza	F.	39	House-work	Oct. 26	Oct. 23	Oct. 25	Oct. 26	Oct. 31	Confluent	Died at Hope Hospital.	Death certificate and mother.	Always weakly.	—
XV. 36	226	53, Howley Lane	R——, Mary	F.	43	House-work	Oct. 26	Oct. 22	Oct. 25	Oct. 25	Oct. 28	Confluent	Died at Hope Hospital.	Husband and death certificate.	Always ailing	"Secondary Hæmorrhage" death certificate.
VIII. 24	238	35, Pinner's Brow	R——, Thomas	M.	15	Tanner	Oct. 29	Oct. 27	Oct. 29	Oct. 29	Nov. 7	Confluent	Died at Hope Hospital.	Father and death certificate.	Good.	—
IX. 2	266	49, Chorloy Street	J——, Jane	F.	38	Housework	Nov. 5	Nov. 4	Nov. 5	Nov. 5	Nov. 9	Confluent	Died at Hope Hospital.	Sister-in-law and death certificate.	—	—
X. 7	277	6, Watkin Street	H——, Martha	F.	28	House-work	Nov. 7	Nov. 4	Nov. 7	Nov. 7	Nov. 13	Confluent	Died at Hope Hospital.	Mother and death certificate.	"Never very strong."	—
I. 5	348	1, Frederick Street	H——, Annie	F.	10 days		Nov. 13	—	Nov. 10	Never.	Nov. 14	Discrete	Died at home	Grandmother	—	—
VIII. 12	385	50, Turner Street	G——, William	M.	28	General labourer.	Nov. 21	Nov. 8	Nov. 11	Nov. 21	Nov. 23	Confluent	Died at Hope Hospital.	Wife and death certificate.	Good.	—
XIV. 27	372	2, Back Hopwood Yard	B——, William	M.	15 days		Nov. 17	—	Nov. 15	Nov. 17	Nov. 22	Confluent	Died at Hope Hospital.	Mother and death certificate.	"	Born November 7th, and vaccinated 8th. Resulted in two good vesicles.
IV. 14	426	85, Cartwright Street	H——, Gladys	F.	1 month		Dec. 2	—	Nov. 17	Never	Dec. 6	Confluent	Died at home	Mother and death certificate.	"	—

Table XV.—*continued.*

Giving Particulars of all the UNVACCINATED Persons, 24 in number, who were certified to have DIED OF SMALL-POX, May 10, 1892, to May 10, 1893—*continued.*

Book Reference.	No. of Case.	Residence.	Name.	Sex.	Age at Death.	Occupation.	Date of Notification.	Date of Onset.	Date of Rash.	Date of Removal to Hospital.	Date of Termination.	Attack. Type.	Attack. Result.	Evidence as to Vaccination.	Previous Health and Vaccination.	Complications and Remarks.
XV. / 1	391	5, Dolman's Lane -	M——, Mary -	F.	4	- - -	Nov. 23	—	Nov. 18	In Hospital.	Nov. 30	Confluent -	Died at Aiken Street Hospital.	Mother and death certificate.	Just recovering from scarlet fever.	—
XV. / 8	390	39, Rose and Crown Street	M——, William -	M.	3	- - -	Nov. 23	Nov. 18	Nov. 20	Nov. 24	Nov. 28	Confluent -	Died at Hope Hospital.	Mother and death certificate.	—	—
I. / 12	451	139, Knutsford Road -	B——, Benjamin -	M.	22	Butcher -	Dec. 7	Dec. 3	Dec. 5	Dec. 7	Dec. 18	Confluent -	Died at Hope Hospital.	Mother and death certificate.	"Fond of his glass": but not intemperate.	—
XV. / 28	452	36, Ellesmere Street -	R——, Thomas -	M.	35	Wood turner -	Dec. 7	Dec. 3	Dec. 7	Dec. 8	Dec. 10	Confluent Hæm.	Died at Hope Hospital.	Wife does not know. No marks were ever seen, or record traceable. Death certificate states unvaccinated.	—	—
XI. / 13	461*a*	2, Hill's Yard - -	E——, Mary - -	F.	13 days	- - -	Dec. 12	—	Dec. 16	Dec. 12	Dec. 21	Confluent -	Died at Hope Hospital.	Mother and death certificate.	—	Vaccinated December 12th, three successful vesicles.
XV. / 14	471	1, Diall's Mill - -	C——, John - -	M.	13 days	- - -	Dec. 16	—	Dec. 14	Dec. 16	Dec. 16	Confluent -	Died at Hope Hospital.	Mother and father -	—	—
V. / 7	474	1, Knight's Yard - -	T——, Henry -	M.	17 months	- - -	Dec. 19	—	Dec. 19	Dec. 19	Dec. 21	Confluent -	Died at Hope Hospital.	Mother and death certificate.	—	Vaccinated December 15th.
XIV. / 5	547	37, Scotland Road - -	W——, John -	M.	19	Negro vagrant	Feb. 13	—	—	—	Feb. 22	Confluent -	Died at Hope Hospital.	Death certificate states "no marks." Lodging-house keeper states not vaccinated.	Was reported to be covered with "syphilitic sores" before small-pox eruption came out.	—
XIX. / 31	573	31, Golborne Street -	W——, Jane -	F.	34	House-work -	Mar. 15	Mar. 13	Mar. 15	Mar. 15	Mar. 22	Confluent -	Died at Hope Hospital.	Patient herself and husband.	Good.	—

Sub-section c.—Analysis of Deaths.

Commentary on death.

Tables XIV. and XV. (pp. 29–33) give full particulars of all the fatal cases, 62 in number, occurring between May 10, 1892, and May 10, 1893, where small-pox was mentioned on the death certificate, grouped into vaccinated, 38, and unvaccinated, 24, persons, and arranged in order of date of eruption. Bearing in mind how much a single death may modify the case mortality of either group, great care has been taken to obtain the fullest information, and the results are here given. Some of the cases call for comment.

Vaccinated Deaths.

Causes of death.

Among the 38 vaccinated persons who died, eight had a markedly alcoholic history, and there is evidence to show as a matter of fact that three of these, numbers 98, 112, and 554, had suffered from delirium tremens before, and they probably died of this disease, the small-pox being but an accident.

Case 117, Thomas E——, æt. 18, did not have small-pox severely, and had been up and about for one or two weeks when he incurred a fresh disease of which he died. I have been unable to obtain any more particulars of this illness, but "small-pox—pyæmia" was given on his death certificate by the Assistant Medical Officer of Health. There is considerable doubt whether his death should be attributed in any degree to small-pox.*

Case 184, Jane H——, æt. 32, was suffering from puerperal septicæmia when she contracted small-pox.

In case 240, Barbara W——, æt. 21, cardiac valvular disease was a contributory cause of death.

Case 265, Mrs. H——, æt. 23, had recently been confined and was in a very critical condition, by reason of pneumonia, before ever she contracted small-pox from her mother, who was nursing her, and who brought the infection from another daughter suffering from unsuspected small-pox.

Case 473, James T——, æt. 42, was suffering from pulmonary consumption in a very advanced stage, and his death was not expedited by small-pox.

Case 607, John M——, æt. nine years and two months, was laid up with inflammation of the lungs and inflammation of the bowels at the time when he contracted small-pox, which latter, his doctor informed me, only played quite a subordinate part in the fatal issue.

In view of the above facts it seems doubtful if six cases (Nos. 117, 184, 265, 473, 554, and 607) ought to be included among the deaths from small-pox in vaccinated persons. Probably 98 and 112 ought also to be excluded if the information were a little more definite. Nevertheless they are all included among the vaccinated deaths.

Evidence as to vaccinated state.

None of these persons had ever been revaccinated. As regards the condition of their primary vaccination the best obtainable information has been procured. Generally this was pretty satisfactory, but in some instances (Nos. 12, 324, 344), it cannot be regarded as quite conclusive. In case 12, for example, the mother and doctor's evidence disagreed, but the circumstantial details given by the former caused the case to be included among the vaccinated persons. The date and place of his birth and vaccination being known, inquiry was made, but no records were available for that time. There was a similar discrepancy in case 607, but a copy of his vaccination certificate procured from Penrith, confirmed the mother's statement. In nearly all fatal cases the eruption is profuse and tends to hide the vaccination scars if they exist. Hence the doctors' or nurses' evidence "unvaccinated" if based solely on their own observation is less valuable than the doctor's statement "vaccinated." Such was probably the source of error which arose in case 473. If the pocks are very plentiful, or are situated over the vaccination scars, or when the congestion and induration of the skin, so characteristic of severe small-pox is present in large amount, then the plainest of scars, and certainly a faint one, is liable to be described as absent.

The Vaccination Registers are not always much help for several reasons. They have not always been as accurately posted and as safely preserved as they might be, especially in times gone by; and the law requiring their preservation was not in force till 1872. The Vaccination Register was consulted in every possible instance.

Mother's evidence

Without doubt the mother's affirmation "unvaccinated" is the best evidence we can possess in such cases. Motives for evasion of law may induce her to make a contrary statement, but there is no possible inducement for her to make this one, unless it be true; and in most instances she will, of her own accord, supply you with the extenuating reasons why the operation was not performed (*e.g.*, "'Cos we was wanderin' round the country"). Sometimes she can give you sufficient detail to judge whether the vaccination "took" or not. Fathers are not so reliable, though they are next best to the mother.

Other kinds of collateral and unskilled evidence have to be judged on their respective merits.

Difficult

Cases 79 and 75. The brothers Peter and James L——, æt. 20 and 8 respectively, are very good illustrations of the difficulties which often beset an inquiry as to vaccination in fatal cases. For a long while I was assured on good authority that they were both unvaccinated persons. I was told that no record could be traced of their vaccination, and no marks could be seen during life. The death certificate, of which I procured a copy, contained the word "unvaccinated" in both cases. Both mother and father of these lads were dead, and those members of the family available could give me no definite information. I therefore included them, at first, in the unvaccinated class.

But some time later I succeeded in finding an older brother, who stated in general terms that he was sure all his brothers and sisters had been vaccinated except little Walter, another child who contracted the disease and recovered (case 80). This statement was confirmed by his Uncle Sam, and an old friend of his mother's. Next I sought an old friend and servant of the family, who said she always "thought Peter was vaccinated; but as to "Jimmy I used to see his maks thro' washin' 'im so often, "he had two good 'uns." Finally, I determined to search the vaccination register myself and found that against the name of Peter L——, who was born on May 26th, 1872, the vaccination entries were vacant, but against the name of James L——, who was born on April 12, 1884, was an entry of successful vaccination on August 22nd, 1884.

Peter, æt. 20, has therefore, in consequence of the conflict of evidence, been classed in the neutral group of doubtful vaccination (Class III.), but James, æt. 8, in view of the vaccination certificate and the servant's specific statement, has been included in Class II., in conformity with the definitions on p. 22, *ante*.

Unvaccinated Deaths.

Age at death.

Of 24 unvaccinated persons who died a large proportion were children, and only 19 of them were over 20 years old.

It will be observed that there were certain persons aged one month and under in the table of unvaccinated fatal cases. This is below the limit allowed by the existing law for the performance of vaccination (three months). By some observers, persons of one month old and under have been excluded in making a comparison of the vaccinated and unvaccinated classes respectively.* But I fail to comprehend the grounds for such exclusion. There were in all 34 babies aged 3 months old and less (*see* Table XXXIX., p. 54) living in the infected houses at the time of my inquiry. They formed units of the community under investigation, and I fail to see why they should be excluded from the statistical calculations. In this report persons of this age have been included whether they escaped or were attacked, whether they died or recovered, in whatever class to which they might happen to belong. It may be further added that during this epidemic the legal limit of age for vaccination was not regarded in that many babies were vaccinated at birth or a day or so later, so great was the scare.

Cause of death.

The evidence of addiction to alcohol which I was able to discover in the unvaccinated cases 1 and 451 did not amount in my judgment to a contributory cause of death in either case. It existed to that extent in the majority of the townsfolk of that class, so far as I could judge (*see* p. 91, *post*).

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* I have since learnt from the Assistant Medical Officer of Health, under whose medical care he was, that his second illness was thrombosis of the lateral sinus, consequent on otitis media, which was followed by pyæmia, of which he died. The small-pox was wholly unconnected with the fatal issue.

* *e.g.*, Dr. Barry: Report on the Sheffield Epidemic, 1887–8, page 17.

Case 391 was recovering from scarlet fever, and this might have been thought a contributory cause of death. But seven other children who contracted the disease under precisely similar conditions (Table III., p. 12)—1 unvaccinated and 6 vaccinated—all recovered.

In case 547 I have given the lodging-house keeper's statement that he had a "syphilitic eruption," but the medical report of the case did not lead one to regard the eruption as anything more than phthiriasis; nor to consider that death was due to anything else than small-pox.

In case 260, æt. 8, the death according to the coroner's verdict was accelerated by the neglect of the mother. Both parents were intoxicated when I visited them at 10 o'clock one Sunday morning a month or two later.

Vaccinated state.

As regards the non-vaccination of these 24 persons there are none which call for remarks beyond those appended in the column headed "Evidence as to Vaccination." If any doubt existed as to their being really unvaccinated persons they were not so included, but were placed in the "vaccinated" class, and therefore in Table XIV. It should be remembered that further information might have placed these latter cases among the unvaccinated.

Ages at Death.

The following Table (XVI.) gives the number of persons who died at the several age-periods among the vaccinated and unvaccinated cases respectively in Warrington 1892–3:—

TABLE XVI.

——	Number of Vaccinated Persons who died.	Number of Unvaccinated Persons who died.
1 month and under	—	8
1 month to 1 year	—	0
1 year to 2 years	—	1
2 years to 5 „	—	2
5 „ to 10 „	2	1
10 „ to 20 „	1	3
20 „ to 30 „	10	4
30 „ to 40 „	14	4
40 „ to 50 „	9	1
50 „ to 60 „	1	—
60 „ and upwards	1	—
Total	38	24

Average age amongst the unvaccinated fatal cases, 14·8 years.
Average age amongst the vaccinated fatal cases, 33·3 years.

It would seem as though vaccination influenced the *average age at death* from small-pox to an extent of an increase of 20 years.

Table XVII. gives the comparative fatality among the vaccinated and unvaccinated at different age-periods calculated from Tables on pp. 51 and 54. The re-vaccinated cases and those previously attacked by small-pox are excluded, leaving a balance of 654 cases.

TABLE XVII.

Age Period.	Vaccinated Cases—Per-centage Fatality.	Unvaccinated Cases—Per-centage Fatality.
Under 1 month	No cases.	100·0
1 month to 2 years	No cases.	25·0
2 years to 5 years	No deaths.	33·3
5 years to 10 years	6·6*	6·6
10 years to 20 years	0·6	16·6
20 years to 30 years	4·5	40·0
30 years to 40 years	12·8	66·6
40 years to 50 years	22·5	50·0
50 years to 60 years	5·9	No cases.
60 years and upwards	12·5	No cases.

* There were 30 cases, of whom 2 died, in the 5–10 years age-period. One of these deaths was case 607, John M——, referred to on page 34; the other was case 75, James L——, about whose vaccination there was some conflict of evidence (page 34). There were 15 unvaccinated cases, of whom one died in the 5–10 age-period.

A fatal Case of doubtful Small-pox.

The above are all the fatal cases in which small-pox was known to be present during life, or was mentioned in the death certificate as a cause of death.

It is necessary in conclusion to refer to a child who died at the age of 17 days.

This child formed the subject of special inquiry and report to this Commission on March 15th, 1893,† as an alleged death from vaccination. Here is an epitome of the case.

Percy S——* was an illegitimate infant born prematurely (8th month) on February 5th, 1893.

The child was small and feeble.

On February 6th the mother developed the eruption of small-pox, and was removed with her baby to the hospital on 7th.

On February 7th the child was vaccinated by the Medical Officer of Health (unsuccessfully) and again on 9th by the Assistant Medical Officer of Health (successfully).

On February 18th (9 days after successful vaccination) it is stated that about 10 pimples appeared on the body and face of the child, which subsequently "had a tendency to "become vesicular." (Assistant Medical Officer of Health.) No constitutional signs.

The baby got gradually weaker, and died on 22nd; death being certified by the Assistant Medical Officer of Health, as due to "premature birth—vaccination." This gentleman subsequently expressed to me the opinion that it had also suffered from small-pox during life; and that he had written to the Registrar-General with a view to amend his certificate of death.

This case would, in conformity with the definitions on p. 22 *ante*, have come in the columns of unvaccinated cases and deaths, and it can easily be added now. The evidence, resulting from very careful inquiry, is more fully recorded elsewhere.† But in view of the facts that various kinds of spots and rashes are so frequent in babies of this class, and that the symptoms of small-pox are usually so severe in persons at this age, the evidence did not appear to me to point conclusively to an occurrence of small-pox in this child.

In view of all the circumstances of this case the prime, indeed the only, cause of death was, in my judgment, asthenia, consequent on premature birth.

This case is not included in any of the tables of cases or deaths; nor is he included among the persons exposed.

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* There was another person of the same name, case 365, æt. 26, not to be confused with this one.

†Final Report of the Royal Commission on Vaccination, Appendix IX., Case 238.

SECTION IV.—COMPARISON BETWEEN THE EPIDEMIC OF 1773 AND THAT OF 1892–3.

Description of 1773 epidemic.

The powers of vaccination to protect from and modify small-pox should, if they exist, be evident in a comparison of the disease as it occurs in a vaccinated, and as it occurs in an unvaccinated community, other conditions being equal; or, if they also vary, sufficient allowance being made for them.

Now it happens that Warrington itself was the scene of a very severe outbreak of small-pox 120 years ago (in 1773) before the introduction of vaccination.

We have a valuable record of this outbreak by the Rev. John Aikin, published in the Philosophical Transactions for 1774. There is no reason for doubting the accuracy of the facts there revealed. The following particulars are extracted from that account, and also that published by Dr. Percival, F.R.S., in his "Essays."* As these and similar works are not, so far as I am aware, sufficiently known—and as people are thereby in danger of forgetting what an unmodified outbreak of small-pox is like—the following extracts, giving particulars of the epidemic, are here reproduced. Fortunately these two eminent authorities happened to be a resident and a native, respectively, of Warrington, and they took more than a passing interest in the health of the town. Dr. Percival practised in Manchester hard bye.

"*The Bill of Mortality of the Town of Warrington for the year* 1773. *By the Rev. J. Aikin. Communicated by Dr. Percival to the Royal Society of London.*†

"The town of Warrington, by the best account yet procured, contains between 1,600 and 1,700 houses. At five persons to a house, which is supposed a sufficient allowance, as but few are occupied by more than one family, this will give somewhat above 8,000 for the number of inhabitants.

"The average of yearly marriages, christenings, and burials, registered in the Parish Church from 1750 to 1769 inclusive, is: Marriages 73, christenings 237, burials 199. That for the years 1770, 1771, and 1772 is: Marriages 95, christenings 331, burials 258.

* * *

"The melancholy overbalance of burials, which now appears, plainly arises from the dreadful ravages of a single disease, the small-pox, which perhaps has seldom raged with greater malignity than in its late visitation of this town. Its victims were chiefly young children, whom it attacked with such instant fury that the best directed means for relief were of little avail. The state of the air went through all possible variations in the course of it, but with no perceptible difference in the state of the disease. In general, the sick were kept sufficiently cool, and were properly supplied with diluting and acidulous drinks; yet where they recovered it seemed rather owing to a less degree of malignity in the disease or greater strength to struggle with it, than any peculiar management.

"Where it ended fatally, it was usually before the pustules came to maturation; and indeed in many they showed no disposition to advance after the complete eruption, but remained quite flat and pale.

"The gradual progress and decline of the disease will appear from the table of months. Its proportional virulence began to abate considerably before it ceased. I cannot with certainty lay down the general proportion of deaths; but in one neighbourhood I found that out of 29 who had the disease, 12 died, or about 2 in 5; in others the mortality was still greater, and I have reason to believe it was not less on the whole. It may perhaps be worthy of observation that the proportion of females who died, to males, was nearly as three to two.

* * *

"WARRINGTON, 1773. BILL OF MORTALITY.

General Bill.

Marriages 93. Births, males 175, females 181, total 356. Deaths, males 223, females 250, total 473.

Table of months of year 1773.

—	Total Deaths.	Small-pox.
January	39	4
February	34	4
March	48	13
April	52	23
May	83	63
June	71	49
July	49	33
August	27	11
September	20	7
October	14	3
November	6	0
December	30	1
Total	473*	211

"TABLE OF DISEASES which caused the Deaths in 1773.

Aged		32
Asthma		3
Chincough		16
Casualties		5
Childbed		5
Consumption, under 14	24	96
„ 14 to 45	36	
„ above 45	36	
Convulsions		34
Dropsy		13
Fever		15
Inflammation of the bowels		2
Measles		1
Mortification		1
Palsy		7
Quinsey		1
Scrophulous swelling		1
Small-pox		211
Soon after birth		6
Suddenly		6
Teething		7
Worm fever		10
Unknown		1
		473

The following extract is from "Essays Medical, Philosophical, and Experimental," by Thomas Percival, M.D., F.R.S. 2 vols. London and Bristol, 1789, *p.* 71 *et seq.*

"In the year 1773, the small-pox raged with great violence in the town of Warrington, and I have procured from my friend Mr. John Aikin an exact account of the number and ages of those who died of it."

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* "Essays, Medical, Philosophical, and Experimental," by Thomas Percival, M.D., F.R.S. 2 vols. Printed in Warrington, 1788, and London, 1789.

† Published in Philosophical Transactions for the year 1774. Vol. 64.

* Probably includes Nonconformists, see footnote * right-hand column of p. 38.

"DEATHS by the Small-pox at Warrington in 1773.

Table of Ages.

	Numbers who died of Small-pox.
Under 1 month - - - -	0
From 1 to 3 months - - - -	4
Over 3 and under 6 months - - -	6
,, 6 ,, 12 ,, - - -	39
,, 1 ,, 2 years - - -	84
,, 2 ,, 3 ,, - - -	33
,, 3 ,, 4 ,, - - -	18
,, 4 ,, 5 ,, - - -	15
,, 5 ,, 6 ,, - - -	4
,, 6 ,, 7 ,, - - -	2
,, 7 ,, 8 ,, - - -	2
,, 8 ,, 9 ,, - - -	4
Total - - -	211"

There are two striking features in this table—

1. There were no deaths from small-pox over 9 years of age. Probably most of the older people had been protected by an attack in early life.
2. That nearly nine-tenths of the deaths (184 out of 211) in 1773 were under 4 years of age. In 1893, 272 vaccinated persons under 4 years were exposed to infection in the infected houses, and not one of them even contracted the disease.

The following Extract is from Dr. Percival's contribution to the Philosophical Transactions, Vol. LXIV., p. 439.

"The comparative mortality of the small-pox at Manchester, Warrington, and Chowbent in the different seasons of the year, may be estimated by the following table:—

—	Manchester from 1768 to 1774.	Warrington. 1773.	Chowbent. from 1767 to 1773.	Total.
January, February, March -	160	21	17	198
April, May, June - -	137	135	7	279
July, August, September -	147	51	2	200
October, November, December.	145	4	1	150
Total - - -	589	211	27	827

" Sydenham has observed that the small-pox when it is mild and regular, usually commences about the vernal equinox, in those years in which it is epidemic, but that it begins earlier when it is of an irregular and more dangerous kind.

" No one can doubt that variations in the moisture, dryness, temperature, and other qualities of the air must influence a disease, which is always of an inflammatory, and often in its last stages of a putrid nature. But the progress of it cannot be regulated by the seasons, because it is derived from contagion; the communication of which frequently depends upon accident, is confined to no period of time, and is varied by its degrees of malignity. During the last visitation of the small-pox at Warrington, the state of the atmosphere went through all possible changes, but with no perceptible difference in the circumstances of the disease."

At foot of this page is a table (XVIII.) summarising the main features of the two epidemics, 1773 and 1893.

The ravages of small-pox in 1773 may justly be regarded as appalling. There were 473 persons of all ages died during that year, and of this number little short of half (211), *all under 9 years of age,* died of a single disease, in a population estimated at 8,000. It was further believed that nearly one-sixteenth of the population were attacked by the small-pox. Even during the cholera epidemic in Warrington of 1832 I noticed, while searching the Parish Church Register, that there were only about 146 deaths from that disease in a population estimated at 16,600.

In order to examine this epidemic more closely let us inquire into—

(*a.*) *Social and Hygienic Condition of the Inhabitants in* 1773.

I have been at great pains to discover, with the help of the British Museum authorities and Mr. Madeley of the Warrington Free Library, the social condition of the Warrington folk at that time.*

They seem to have been a comparatively simple-minded people in those days, occupying what was then practically only a village situated on the river Mersey, from the clear and abundant waters of which they caught salmon. Now it is a sluggish, highly-polluted stream in which no fish can live.

Their chief business was sail-making, a healthy and cleanly occupation. The iron and metal manufactures are mentioned in 1795, but had not taken root in 1775.

The people lived chiefly out of doors; and so far as I can gather from old records, they lived healthier lives than in the present day.

Perhaps the people were not quite so intelligent then, though I have no information on this particular point, but it is hard to imagine that it were possible for them to be more lacking in a rudimentary knowledge of cleanliness,

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* "Description of country round Manchester," by J. Aikin, M.D., published in London, 1795. "A six months' tour through the North of England," by Arthur Young, 4 vols., London, 1770. Dr. Thos. Percival, F.R.S., "Works, Literary, Moral and Political." 2 vols. Bath, 1807. Rev. J. Aikin, loc. cit.; and "A glance at the History of Warrington," by an Inhabitant, 1860.

TABLE XVIII.

GIVING a COMPARATIVE SUMMARY of the leading features of the SMALL-POX EPIDEMICS of 1773 and 1893 in Warrington.

—	In the Year 1773. Small-pox unmodified by vaccination or inoculation.	In the Year 1893. (May 10, 1892 to May 10, 1893). Small-pox modified by Vaccination.
Population - - - - -	8,000*	54,084
Number of cases of small-pox - -	510*	667
Number of deaths from small-pox - -	211†	62
Average age of fatal cases of small-pox -	2½ years	Vaccd. 34 yrs. Unvaccd. 14 yrs.
Death-rate per 1,000 inhabitants from small-pox.	26·4	1·1
Number of deaths from all causes *other than* small-pox.	262	1,217
Proportion of small-pox deaths to deaths from all causes per cent.	44·7	5·4

* These are figures estimated by Rev. J. Aikin, all the rest are actual figures.
† All under nine years of age.

the management of their children, and similar health conditions than their descendants were when I visited them from house to house in 1893.*

The position of the town was the same, and the general surroundings of the people, so far as they are known in the present day to affect small-pox, were as a whole no worse than they are now; in a word, the two communities are comparable as regards social and health conditions. If either gains by the comparison it is the older one.

Small-pox was certainly regarded as a catching disorder; both Aikin and Percival tell us so. In some other parts of the country at that time, no doubt, inoculation of small-pox was practised to a considerable extent, but at Warrington Mr. Aikin reckons that there were not more than 10 persons who had been inoculated. It may safely be assumed that his figures concern natural small-pox unmodified in any way. The possible confusion of small-pox with measles and other diseases is dealt with on p. 39.

Small-pox is not a disease over which medical treatment, at least modern medical treatment, has any influence, and it is interesting to learn from Mr. Aikin's account that the same fact was realised in 1773, *only simple cooling measures being adopted.*

(*b.*) *An examination of the causes of death other than Small-pox in* 1773.

In 1773 there were 262 deaths* in Warrington from different causes, excluding the 211 registered as small-pox, and this gives, with a population, as estimated by Mr. Aikin, of 8,000, a death-rate of 32·75 per thousand of the population compared with 24·6 in 1891,† when there was no small-pox, a difference of 8 per thousand in the course of 120 years.

This is not a very remarkable difference when one bears in mind the phenomenal improvement which has taken place in all kinds of medical treatment during that epoch of time and the almost complete disappearance of typhus fever.

Table XIX. (given at foot) shows a comparison between the different causes of mortality in these periods respectively.

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* Their present social condition is further referred to in Part IV. of this Report.

* This probably includes Nonconformists, for I find on inspection of the Parish Church Register, which has been kept up ever since the 16th century, that the total deaths in the Church Register only amount to 455 or 18 short of the official lists of mortality (473). It would seem probable, therefore, that these 18 came from the Nonconformists.

† This year has been taken as the latest when all the necessary figures were available. It has the additional advantages of having had no small-pox.

TABLE XIX.

SHOWING the COMPARATIVE MORTALITIES and several CAUSES OF DEATH, other than SMALL-POX, grouped into Classes somewhat comparable with each other, occurring in the Years 1773 and 1891 respectively.

Causes of Death in **1773** as per Bill of Mortality.*	Number.	Total.	Number of Deaths in 1891 from same Group of Causes divided by 6·6.†	Causes of Death as registered at the District Registrar's Office, **1891**.	Number.	Total.	——
A.—Consumption, under 14 -	24			A.—Phthisis -	73		
„ 14 to 45 -	36			Diseases of respiratory system	308		
„ above 45 -	36						
Asthma -	3						
		99	58			381	
B.—Measles -	1			B.—Measles -	80		
Fever -	15			Scarlet fever -	9		
Inflammation of the bowels -	2			Typhus -	1		
"Worm fever" -	10			Enteric fever -	13		
Quinsey -	1			Simple and ill-defined fever -	—		
		29	23	Diarrhœa and dysentery -	41		
				Diphtheria -	11		
						155	
C.—Dropsy -	13			C.—Diseases of the circulatory system.	68		
"Suddenly" -	6						
		19	10			68	
D.—Palsy -	7			D.—Diseases of the nervous system	139		
Convulsions -	34			Cancer -	29		
Aged -	32			Whooping cough -	19		
Mortification -	1			Diseases of digestive system -	79		
Chincough -	16			Diseases of the urinary „ -	19		
Unknown -	1			Disease of the generative „ -	7		
				All other causes -	348		
		91	144			640	
E.—Childbed -	5			E.—Puerperal fever -	1		
				Childbirth -	3		
		5	·			4	
F.—Casualties -	5			F.—Violence (inquests) -	47		
		5	7			47	
G.—Soon after birth -	6			G.—Tabes mesenterica -	17		
Teething -	7			Other tubercular and scrofulous diseases.	43		
Scrofulous swelling -	1						
		14	1			60	
Total deaths from all causes excepting small-pox -		262	—	Total deaths from all causes excepting small-pox -		1,355	—
Total deaths from all causes excluding small-pox and respiratory diseases -		163	=20·4 per 1,000	Total deaths from all causes excluding small-pox and respiratory diseases -		974	=18·3 per 1,000

* Rev. J. Aikin, Phil. Trans. 1774.

† Because the population in 1773 (8,000), was 6·6 times less than it was in Midsummer 1891 (53,000).

Similarity of death rate.

It is extremely difficult to compare the causes of death registered at such distant periods of time, but the registered causes have been grouped so as to make them more comparable. It will be seen that the discrepancy between the death-rate of 1773 and that of 1891 may virtually be accounted for by the difference in the deaths certified as "consumption" and "asthma" on the one side, and "phthisis" and "respiratory diseases" on the other; diseases which are, perhaps, more likely to have been correctly registered than the others, and which, moreover, are not considered preventible diseases, except in a climatic sense.

If these deaths be excluded from both sides it will be seen that the death-rates of the two periods are very similar. The death-rate of Warrington in 1773 from diseases other than respiratory diseases and small-pox was 20 per 1,000 inhabitants, living. The death-rate of Warrington in 1891 from diseases other than respiratory diseases and small-pox was 18 per 1,000 inhabitants living.

The two communities (Warrington in 1773 and in 1893) may therefore be fairly taken as comparable from a social and hygienic point of view; but in the one no inhabitants had been vaccinated, whereas in the other all the inhabitants, excepting a small fraction, had been vaccinated in infancy, of whom a similarly insignificant fraction had been vaccinated since infancy.

(*c.*) *Attack rate from Small-pox in* 1773.

1. From the actual figures before us (211 known *deaths* in a population of 8,000, and 667 known *cases* in a population of 54,000) it is obvious that the attack rate of 1773 was more than double that of 1893 (26·0 and 12 per 1,000 population living), even on the extreme supposition that every person attacked died of the disease in 1773, and not excluding the unvaccinated persons and cases from the 1893 epidemic.

2. But Mr. Aikin states that in one district, at least "12 "in every 29 attacked died." The number of deaths is known, and consequently it may be estimated that 510 persons were attacked in the population of 8,000, an attack-rate of 64 per 1,000 in Warrington (1773) as compared with an attack-rate of 11 per 1,000 in the vaccinated Warrington, 1892–3.*

3. Finally, it will be seen from a history of the prevalence of small-pox in Warrington (Sub-section *f*) that the disease which had been endemic in the town up to the year 1853, when the practice of vaccination was first made compulsory by the State, thenceforth became only epidemic.

(*d.*) *Severity and Fatality of Small-pox in* 1773.

1. It seems a very reasonable question to ask—Did all these 211 children really die of small-pox, in view of the fact that this disease is apt to be mistaken for measles at that time of life; and, when the little patients sometimes die before the pustular stage is reached? There is, moreover, an undoubted tendency during the medical overwork of an epidemic for deaths to be set down to a prevailing disease which do not belong to that category; although small-pox is not easy to mistake, and was seen so much in those days.

Now among the diseases separately classed in the last century and mentioned on the preceding page (Table XIX., left-hand column), "Fever," "Worm-fever," and Measles are probably the only ones which would have had to be sorted out from the 211 small-pox deaths. And if deaths from these causes had to any extent been included in the 211, the death-rate from these causes during the year 1773 would probably be less than that of other years. I have therefore collected from the bills of mortality the death-rates from these several causes through a series of years, and embodied them in Table XIX*a*., p. 42.

As regards measles, it will be seen that the death-rate in 1773 was somewhat *below* the average death-rate from that disease at that epoch, and also below the average in the present day—being 0·12, 0·65, and 0·412 per 1,000 respectively. It is, therefore, possible that a few deaths from Measles were included in the 211, possibly about six deaths, which would bring the death-rate of 1773 up to the average at that epoch. On the other hand the Death-rate from "Fever" and "Worm-fever" in 1773 was a little above the average death-rate from those causes (3·1, average 2·02). But, even if it be assumed that six or a few more deaths from Measles were in error included among the deaths from Small-Pox, it would not very considerably modify the heavy mortality from Small-Pox among the people of Warrington in 1773.

Medical men must have been perfectly familiar with these two diseases in those days, and the probable error was not likely to have been very great.

TABLE XX.

SHOWING NUMBER of PERSONS who DIED of SMALL-POX, at all and at certain Ages in Warrington in 1773 and 1893 (May 10th, 1892, to May 10th, 1893) respectively.

Ages.	Persons who died of Small-Pox.			——
	1773.*	1893. Vaccinated Deaths.	1893. Unvaccinated Deaths.	
1 month and under	—	—	8	
From 1 to 3 months	4	—	—	
„ 3 „ 6 „	6	—	—	
„ 6 „ 12 „	39	—	—	
„ 1 „ 2 years	84	—	1	
„ 2 „ 3 „	33	—	—	
„ 3 „ 4 „	18	—	1	
„ 4 „ 5 „	15	—	1	
„ 5 „ 6 „	4	—	—	
„ 6 „ 7 „	2	—	—	
„ 7 „ 8 „	2	—	—	
„ 8 „ 9 „	4	1	1	
„ 9 „ 15 „	—	1	1	
„ 15 „ 20 „	—	1	2	
„ 20 „ 25 „	—	6	1	
„ 25 „ 30 „	—	4	3	
„ 30 „ 35 „	—	6	1	
„ 35 „ 40 „	—	8	3	
„ 40 „ 45 „	—	6	1	
„ 45 „ 50 „	—	3	—	
„ 50 „ 55 „	—	—	—	
„ 55 „ 60 „	—	1	—	
„ 60 „ 65 „	—	1	—	
Total	211	38	24	
		Total	62	

NOTE.—Average age at death in 1773 = 2½ years. Average age in 1893, = 26 years.

Average age in vaccinated, 1893, = 33 years. Average age in unvaccinated, 1893, = 14 years.

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* Thus, from Table XII., p. 28, it will be seen that, if the 68 unvaccinated cases be excluded, there is a remainder of 599 cases of small-pox; and in sub-section *b*, p. 24, *ante*, we have seen that in the total population of 54,084 in the summer of 1892, there probably existed ·8 per cent. of unvaccinated persons, leaving a residue of 53,651. Having thus excluded the unvaccinated cases and the unvaccinated persons from the respective groups, the attack rate was 11 per 1,000.

* From particulars supplied by Rev. John Aikin, and published by Dr. Percival in his "Essays." (*See* p. 37 *ante.*)

Case-mortality.

2. We have no record of the severity of the cases in 1773, nevertheless, Mr. Aiken, who seems to have studied the outbreak with great care, tells us "that out of 29 who had "the disease 12 died, or about 2 in 5." This would give a case-mortality of 40 per cent. It does not differ very largely from the case-mortality among the unvaccinated in our day (68 cases, 24 deaths, *35 per cent.*).

Mean annual mortality from small-pox in 1773.

3. The death-rate from small-pox in Warrington in the year 1773 was *26·4 per 1000* (211 in a population of 8,000). The death-rate among the vaccinated inhabitants of Warrington in 1893 was *·6 per 1,000,* 38 in a vaccinated population of 53,654 (deducting ·8 per cent. unvaccinated from 54,084).

(*e.*) *Age Incidence.*

But the most striking fact in the comparison of the epidemics of 1773 and 1893 is the age at which small-pox was fatal, as shown in Table XX. (p. 39 *ante*).

It will be seen that there were no deaths in 1773 over nine years of age, the very age at which the vaccinated deaths in 1893 commence.

It will also be seen that the average age at death from small-pox in Warrington 1773, was 2½ years; and in Warrington 1893, 26 years, or excluding those dying unvaccinated in 1893, the average age at death was 33 years.

If we take the small-pox deaths in decades of age, as in Table XXI. (at foot), it would seem, from a comparison of cols. A. and B., that vaccination shifts the age period of maximum number of deaths onward, from the first decade to the fourth decade of life.

This important causal connection receives confirmation from the fact that the same decade (the first) is the one chiefly affected among the unvaccinated in 1893. And this latter comparison (of cols. B. and C.) deals with persons living side by side under precisely the same conditions, excepting as regards their having being unvaccinated or vaccinated respectively.*

In perusing Table XXI. (at foot) it is important to bear in mind (*a*) that the former endemic prevalence† of this infantile scourge, afforded protection to, at all events, a very large proportion of those living in 1773 at the older ages, for many of them had had the disease; and (*b*) at a later epoch, (say 1853–1883), the endemic prevalence had disappeared, and therefore the protection thus afforded by previous attack to persons from 10 to 40 years of age in 1893, had disappeared.

The inference from the comparison between the two epidemics is that the practice of vaccination has favourably modified the small-pox so as to lessen the death-rate from that disease in the population 24 times, and to shift the chief age period of death from the disease forward from the first to the fourth decade of life (see also Table on p. 51).

(*f.*) *The prevalence of Small-Pox in Warrington at different periods of time between* 1773 *and* 1891.

Enden preval in Wa ton 17 1891.

Warrington has frequently had small-pox among its inhabitants; indeed, this town has hardly ever escaped whenever it has been prevalent in the middle or north of England, probably on account of its position on the high road to and from Manchester, Liverpool, Birmingham, and other large towns.

It will therefore be interesting to examine a list of the different years when deaths from small-pox occurred, so far as is known (Table XXII., next page).

We have an accurate record of the year 1773*, and, with comparatively few exceptions, of the years 1791 and onwards, contained in the bills of mortality preserved in the Warrington Free Library.

It is evident from these records that small-pox was endemic in the town of Warrington from 1773 (and earlier) up to 1851.

The following extracts from the writings of Dr. Daniel Moss, are interesting as showing the prevalence of the malady and its effect on infantile mortality. It is apparent also from these that small-pox was not absent during the years 1774–1790, although the records of this interval are missing. Dr. Daniel Moss was a doctor practising in Warrington, and from a thesis in the Warrington Free Library it appears that he took his degree at Glasgow. He drew up the Bills of Mortality for the Authorities, and it is from his "Observations" appended to the Bills for 1791–92† that the following extracts are taken.

"Infant deaths everywhere swell the gloomy lists of mortality, especially in cities and larger towns, which are in a peculiar degree fatal to them. In London and all the great capitals of Europe, upon an average, one half of the children born, die under two years of age. In country towns and villages the proportion of infant mortality greatly decreases. In Manchester half the children born die under five years of age; but were the ravages of small-pox prevented by any means, the number of deaths under that period would not fully amount to one in four" (25 per cent.).

"During the year of 1790, when two principal epidemics prevailed, namely, the small-pox and putrid fever, which swept away a considerable number of inhabitants, the total burials was less than the births by eleven."

"The circumstance that hath occurred to raise the list of deaths of the present bill so much higher than that of the preceding, must be solely ascribed to the natural small-pox, as the mortality from other causes is diminished. This epidemic (the scourge of the human race) prevailed for the most part during the year 1792, though not to the extent or with the malignity we have before experienced. As it made a complete progress through the town in 1790, there were comparatively few subjects capable of receiving the infection. From this, as well as the facts in our former bills, it appears that the spread of small-pox at a place depends solely upon the number of people liable to take it, and not upon any peculiar state of the air."

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[*] The facts here revealed correspond very precisely with those elicited by Dr. R. J. B. Cunninghame, as regards Edinburgh, and already submitted to the Commission, (Sixth Report, p. 642.) In that town out of 2,500 deaths from small-pox during the years 1764–83, all but 17 occurred in persons under 10 years of age. Whereas, 100 years later (1864–83) a larger number of deaths from small-pox occur over 15 years of age than under that age.

[†] *See* next sub-section *d.*, and also quotation from Dr. Percival's essays *ante.*

[*] Rev. J. Aikin, *loc. cit.*

[†] Preserved in the Warrington Free Library.

Table XXI.

——	A. Unvaccinated Deaths, 1773.	B. Vaccinated Deaths 1893.	C. Unvaccinated Deaths 1893.
0–10 years - - - - -	211	2	12
10–20 „ - - - - -	0	1	3
20–30 „ - - - - -	0	10	4
30–40 „ - - - - -	0	14	4
40–50 „ - - - - -	0	9	1
50–60 „ - - - - -	0	1	0
60–70 „ - - - - -	0	1	0
Total - - -	211	38	24

CHRONOLOGICAL SUMMARY of SMALL-POX DEATHS in WARRINGTON, 1773 to 1891.

Historical summary.

Table XXII. below reveals the following points:—

1773.—Natural small-pox endemic to the town.

1773 to 1842.—Total number of deaths from small-pox known to have occurred in 30 of these years, of which records exist, 1,039. *Average 35 per annum.*

1843–54.—Total deaths from small-pox during 12 years, 132. *Average 11 deaths per annum.*

1855 to 1867.—Small-pox ceases to be endemic in Warrington. Total deaths from small-pox during 13 years, 81. *Average. six deaths per annum.*

30 and 31 Vict. cap. 84 (1867).—Vaccination made more efficiently compulsory.

(January 10, 1872, Mr. Wm. Harrison appointed the first Vaccination Officer at Warrington under the Act of 1871.)

1868–91.—24 years. Total deaths from small-pox, 63. *Average of two deaths per annum.*

There is no reason for doubting the authority of the records above quoted, but it should be remembered that prior to 1839 the records do not exist for every consecutive year. In the meantime the population of Warrington has steadily grown from 8,000 to 53,000. The number of deaths per annum from small-pox *diminishes* seventeen and a half times, although the population *increases* six and a half times.

TABLE XXII.

GIVING PARTICULARS concerning the prevalence of SMALL-POX in WARRINGTON, 1773 to 1891.

The columns of deaths from 1794 to 1845 only include those deaths registered in the parish church.

Year.	Total Number of Inhabitants in that Year.	Total Deaths from all Causes.	Deaths from Small-Pox in that Year.
1773 - - -	8,000*	473*	211†
1791 - - -	10,000 (estimated)	286	10‡
1792 - - -	10,100	314	52‡
1794 - - -	10,200	319	68‡
1795 - - -	10,300	314	46‡
1796 - - -	10,500	441	92‡
1797 - - -	10,600	248	20‡
1801 - - -	11,300	421	54‡
1807 - - -	12,000	322	1‡
1810 - - -	12,700	396	74‡
1818 - - -	14,000	476	5‡
1820 - - -	14,500	320	7‡
1821 - - -	14,600	349	14‡
1822 - - -	14,700	339	29‡
1823 - - -	15,000	426	28‡
1825 - - -	15,200	347	17‡
1826 - - -	15,400	524	32‡
1827 - - -	15,600	439	24‡
1828 - - -	15,800	400	17‡
1829 - - -	16,000	486	21‡
1832 - - -	16,600	559	33‡
1833 - - -	16,800	531	28‡
1834 - - -	17,000	579	8‡
1835 - - -	17,200	436	2‡
1836 - - -	17,400	489	77‡
1837 - - -	17,600	661	14‡
1839§ - - -	18,200	545	5‡
1840 - - -	18,400	468	18‡
1841 - - -	18,600	517	26‡
1842 - - -	19,000	584	6‡
1843 - - -	19,300	486	2‡
1844 - - -	19,600	483	2‡
1845§ - - -	19,800	457	3‡
1846 - - -	—	615	40
1847 - - -	—	1,011	27
1848 - - -	—	571	1
1849 - - -	—	617	2
1850 - - -	—	561	0
1851 - - -	22,894	597	53
1852 - - -	—	571	2
1853 - - -	—	644	0
1854 - - -	—	644	
1855 - - -	—	555	0
1856 -	—	562	0
1857 - - -	—	698	0
1858 - - -	—	610	1
1859 - - -	—	565	30
1860 - - -	—	581	1
1861 - - -	25,953	736	0
1862 - - -	—	635	0
1863 - - -	—	1,198	1
1864 - - -	—	801	17
1865 - - -	—	743	31
1866 - - -	—	1,106	0
1867 - - -	—	746	0
1868 - - -	—	828	0
1869 - - -	—	875	15
1870 - - -	—	983	10
1871 - - -	32,144	901	5
1872 - - -	—	768	15
1873 - - -	—	803	0
1874 - - -	—	895	5
1875 - - -	—	948	1
1876 - - -	—	876	1
1877‖ - - -	—	907	0
1878 - - -	—	905	8
1879** - -	37,000	982	0
1880 - - -	40,000	823	0
1881 - - -	41,456	841	1
1882 - - -	42,600	1,037	0
1883 - - -	43,814	947	0
1884 - - -	44,482	943	0
1885 - - -	45,408	838	0
1886 - - -	46,343	982	0
1887 -	47,264	1,122	0
1888 - - -	47,464	980	2
1889 - - -	49,000	1,084	0
1890 - - -	50,068	1,133	0
1891 - - -	52,743	1,339	0

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* Bill of Mortality of Warrington, Phil. Soc. Trans. 1774.

† All these deaths occurred under 9 years of age, and mostly in April, May, and June. Three-fifths of all who died were females.

‡ Bills of Mortality published in Warrington for the authorities of the Parish Church.

§ Up to this year the number of inhabitants have been estimated from the number of inhabited houses; subsequently the figures are from the Registrar-General's returns.

‖ Fever Hospital established this year, 1877.

** Compulsory notification adopted, 1879. The figures from here to end are from the reports of the Medical Officer of Health for Warrington.

SECTION V.—ON THE CHARACTER OF VACCINATION SCARS.

The existence of characteristic vaccination marks is undoubted evidence of previous vaccination; but, as doubt may be thrown on the value of the size, texture, and other characters of the scars as a means, in general terms, of estimating the efficiency of the operation and its alleged protective power, it may be well to examine this question.

In measuring the vaccinated condition of persons concerned in this epidemic, the definitions set forth at the commencement on page 22 were strictly adhered to.

a. Statistical evidence derived from this epidemic.

As regards protection from Attack, it will be seen from Table IX. (p. 26, *ante*) that there were rather more "well vaccinated" (63 per cent. as compared with 61 per cent.), persons to be found in the uninfected than in the infected houses. Moreover, an inspection of Table X. (page 27), shows that, out of 2,535 persons exposed to infection in the infected houses, a larger proportion of the "indifferently vaccinated," 27 per cent., were attacked than of the "well vaccinated," 21 per cent.

And Table X. (p. 27, *ante*) also shows, in reference to the measure of *modifying* power, that the case mortality amongst the "doubtfully vaccinated" (40 per cent.), was considerably higher than amongst the "indifferently vaccinated" (9 per cent.); and this was higher than that amongst the "well-vaccinated" (3 per cent.).

b. Exceptional instances.

Very early in the inquiry I was, on visiting infected houses, struck with the fact that out of several persons equally exposed to infection in an infected house, those with good marks (measured as stated) sometimes contracted the disease, while those with bad ones escaped; and again of two persons who contracted the disease, living under the same conditions of life, and apparently the same in all respects, a "well-marked" person might incur a very severe, while the one with bad marks would incur a mild attack.

The following are illustrative instances of what I mean.*

1. *Case 49* (Annie C——), æt. 18 (*see* photograph 1) represents the arm of a girl who developed a severe attack of confluent small-pox on September 5th 1892, and was nursed at home with three other occupants of the house for 10 days after the appearance of the eruption. Her face is very badly pitted. The patient's vaccination scars are very perfect ones, according to current views; three scars making an aggregate of 1½ square inches completely foveate area. The marks of the other members of the family, æt. 42, 41, and 22 respectively, are small, faint, and imperfect, very faintly foveate, and considerably under an aggregate of ½ square inch each. None of the household had been vaccinated since infancy. Thus the most recently vaccinated and the best marked person in the household contracted the disease badly, and the rest escaped.

2. Three cases of small-pox occurred in a respectable family of nine persons, all vaccinated in infancy, but never since until after the house became infected. None had ever had small-pox before.

Jane (case 175), æt. 17, eruption October 14, very mild small-pox, had far the best vaccination marks of the household. She had three large entirely foveate marks measuring about 1×⅝ inch, a total area of 2·262 square inches.

William, æt. 19, eruption, October 29th, severe confluent small-pox, had three foveate marks, ·282 square inch, together covering ·846 square inch.

Mary, æt. 24, eruption, October 30th, confluent small-pox. His arm bears five marks, two foveate ones, measuring ·126 square inch each, and three plain ones, measuring each ·126 square inch; total vaccinated area ·630.

These three persons were the three best vaccinated in the house, and were all over ½ square inch in area, ranking as first class.

The other six members of the family were:—Thomas, æt. 23—2 foveate ·282=·564 square inch. George, æt. 13—3 foveate ·126=·378 square inch. The father, æt. 59—1 foveate=·282 square inch. Arthur, æt. 7—2 foveo-cicatrical ·126=·252 square inch. The mother, æt 54—1 plain =·196 square inch. Harriet, æt. 16—hardly discernible and unmeasurable (? 3).

The source of infection to the first case, Jane, was a patient next door, who was treated at home all the while. The source of the other two was either the case next door or their sister Jane. All the family lived much together, were all very healthy, and *Mary* and *Harriet* worked side by side as packers at a chemist's. None of them held more communication with their neighbours than speaking to the wife of the patient across the garden wall: they were not on intimate terms. The whole family were surrounded by identically the same conditions, excepting differences of age.

It follows therefore—

1. The best marked in this household was the first to contract the disease, exposure to infection as far as could be traced being equal.
2. That the worst vaccinated person entirely escaped infection.
3. That out of nine persons the three "best vaccinated" contracted the disease, they all ranking as very first class vaccinations. The exposure to infection was probably the same in all.
4. That the six who escaped were all inferior to the other three, five of them being only up to the standard of indifferent vaccination as measured by current doctrines.

These instances have been mentioned because, meeting them all at one time, and early in the inquiry, I was very nearly led thereby into drawing conclusions on insufficient grounds and without allowing for sources of error.

The texture of the vaccination scar as we see it in the adult may have been modified by several conditions.

The foveation of vaccination scars does but follow the same laws which govern other lesions involving only the superficial layers of the skin, such as the pitting after a burn on the arm of M. R., the child of case 276, photograph 2, opposite. Here the pitting or foveation simply indicates the contraction of the dermal papillæ, and in all such scars the foveation varies considerably with the lapse of time.

The rate of growth, or rather subsidence, of all scars is an unknown factor, but they all tend to become obliterated as age advances, and vaccination marks are no exception to this law.

This is doubtless a reason why a larger proportion of indifferently vaccinated persons is to be found in the later decades of life (*vide* Tables V. and VI., page 23, and XXXI., page 49).

The character and size of the scar may also, it is conceivable, depend on the surroundings and state of health of the child at the time of vaccination—conditions on which the amount of suppuration and scar formation in any individual so much depend.

In a person also who gets fat, the stretching of the skin produces obliteration of the marks, as in the mother, æt. 47, of case 82.

All these are fallacies which were difficult to avoid, and I did not in this inquiry find the texture of the vaccination scar an invariable test of the efficiency of the vaccination; although I carefully grouped the different qualities of texture as mentioned on p. 22.

In conclusion, as regards *the size* of the cicatrices, the statistical facts of this epidemic seem to show that the aggregate area of the scars left by vaccination is in some degree a measure of the protection afforded.

From the data before me there are, however, no means of differentiating the character of *foveation* or texture as a measure of protection apart from the *size* of the marks.

The texture of revaccination scars is only occasionally foveate. There seems also a tendency for them to become less so, and also smaller after repeated revaccinations.

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* Nos. 171, 195, 37, 150, 259, 262, 456, 445, 320, 327, 136, 627, 614, 555, 95, 53, 121, 185, 50, 84, 2, 276*a*, 140, 109, 145, might also be regarded as instances.

TABLE XIX*a*.

Showing DEATH-RATE from MEASLES and WORM-FEVER per 1,000 PERSONS living.—Referred to on p. 39.

—	Death-rate for Warrington. Figures derived from the Bills of Mortality (*see* Table XXII., p. 41) for 1773 and the next nine years during which they have been preserved.										Death-rate for the whole of England. Annual Report of Registrar-General: Supplement 1885, p. 112.		
	1773.	1791.	1792.	1794.	1795.	1796.	1797.	1801.	1807.	1810.	10 years, 1851–60.	10 years, 1861–70.	10 years. 1871–80.
Deaths from "Measles" per 1,000 persons living - - -	0·12	0·20	0·29	0·58	1·00	1·33	—	0·35	0·50	1·49	0·412	0·440	0·378
Deaths from "Fever" and "Worm-Fever" per 1,000 persons living - - -	3·1	1·4	1·5	1·3	2·4	2·7	1·6	—	2·0	2·2	—	—	—

NOTE.—Average death-rate from Measles in Warrington during 10 of the years, 1773–1810 = 0·65 deaths per 1,000 persons living; ditto in all England, 1851–1880 = 0·412 per 1,000. Average death-rate from "Fever" and "Worm-Fever" in Warrington during 10 of the years, 1773–1810 = 2·02 deaths per 1,000 persons living.

Photo 1, p. 42.

ROYAL COMMISSION ON VACCINATION.

Dr SAVILL'S REPORT ON THE WARRINGTON SMALL POX EPIDEMIC 1892-3.

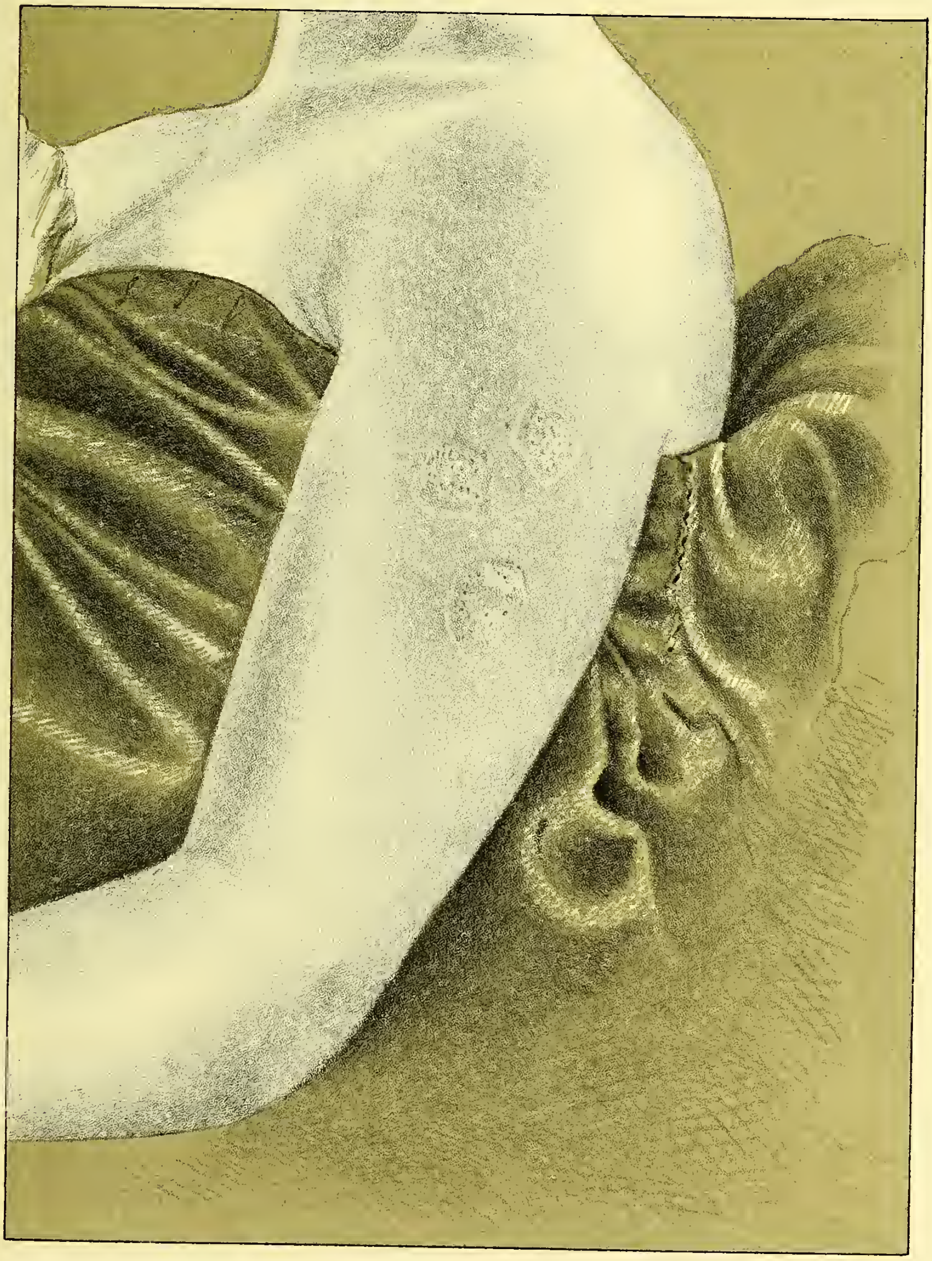

Photo 1. Arm of Annie C______, æt. 18, (Case 49), Confluent Small-pox; showing three typically foveate scars, the result of vaccination in infancy. Total area 1½ square inches.

3768-9-97

Photo 2, p. 42.

ROYAL COMMISSION ON VACCINATION.

DR SAVILL'S REPORT ON THE WARRINGTON SMALL POX EPIDEMIC 1892-3.

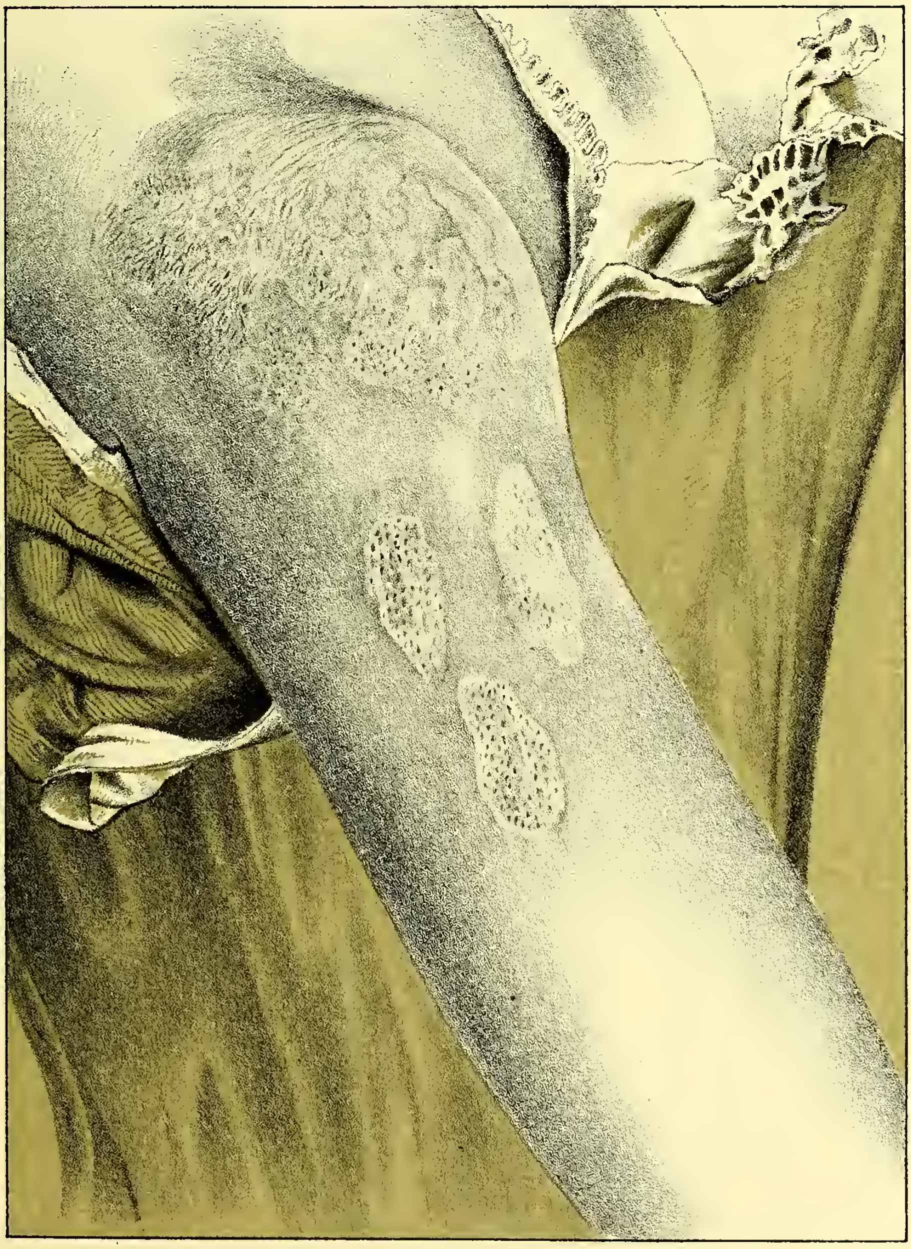

Photo. 2. Arm of Mary R ——, æt. 10 (daughter of Case 276$\frac{11}{7}$) To show the similarity of foveate texture in a scar resulting from a superficial burn on shoulder. 8 years before, and in the scars of vaccination in infancy, 10 years before the date of the photograph (June 1893).

SECTION VI.—THE INFLUENCE OF RE-VACCINATION ON SMALL-POX.

Hitherto we have dealt only with primary vaccination in its relation to small-pox. It will now be necessary to ascertain what influence, if any, re-vaccination had on the Warrington epidemic.

(*a.*) *Re-vaccinated Condition of Town in August* 1892.

There were no means of ascertaining the precise number of re-vaccinated persons in the whole of Warrington at the commencement of the outbreak. But if the Aikin Street area (p. 24, *ante*) may be taken as representing the whole town, there were only 2·7 per cent. who had been vaccinated twice or oftener during their lives.

There were reasons for believing that in the whole town considerably less than this proportion had been re-vaccinated prior to the large outbreak. Many persons in the Aikin Street area, included in the 2·7 per cent., had been re-vaccinated during the scar consequent on the small preliminary outbreak in May, between that date and August 1892, because of the proximity of Aikin Street to the hospital. And as regards the whole town, the Public Vaccinator informed me that only 34 persons were re-vaccinated at the public vaccination station during the seven years, July 1885 to July 1892.

The same gentlemen states that nearly 17,000 persons were known to have been re-vaccinated from July 1892 to March 1893 inclusive. 881 were done at the usual public vaccination station, Golborne Street; 1,482 at the five stations specially established by the Corporation; and 14,539 by private practitioners, mostly workpeople at the expense of their employers; all during the progress of the epidemic.

The various provisions made for re-vaccination will be found on p. 20, *ante*.

(*b.*) *Re-vaccinated State of Infected Houses.*

In investigating the re-vaccinated condition of the infected houses, an inmate has been counted as re-vaccinated who had been successfully operated on more than 14 days prior to the appearance of the eruption on the patient in the house; taking 14 days as the period of inoculation of small-pox.* Persons re-vaccinated within that limit of time will be dealt with subsequently (p. 45).

Attack-rate.

There were 63 re-vaccinated persons dwelling in houses invaded by small-pox, and of these, 7, or 11·1 per cent. were attacked† (*i.e.*, excluding 1 who had previously had small-pox).

This is the lowest attack-rate among any of the "vaccination classes," and, as will be seen from an inspection of Table X. (p. 27), it is lower than the attack-rate amongst persons who had priviously had small-pox, for 12·2 per cent. of these latter developed small-pox a second time.

(*c.*) *Re-vaccinated Cases of Small-Pox.*

The annexed table (Table XXIII.) gives particulars of the only successfully revaccinated persons who contracted small-pox during the epidemic; eight in number.

Two of these persons call for comment,—

1. The remarkable case of a woman (No. 620), Mary M———, æt. 30, who was vaccinated in infancy (½ in foveate area), was successfully revaccinated in 1873, æt. 10 (½ in foveate area), had small-pox about, probably at, the same time, and finally contracted a severe attack of confluent small-pox in April 1893, which resulted in her face being badly pitted. Interval of 20 years between re-vaccination and small-pox a second time.

2. A man (No. 295), Jno. A———, æt. 37, who lived in one of the lodging-houses, vaccinated in infancy (⅓rd in non-foveate area) again in 1870, æt. 15 (⅓rd in non-foveate area), contracted discrete small-pox in November 1892. Interval of 22 years between re-vaccination and small-pox. This man is excluded from the estimation of the attack-rate among the revaccinated for reasons given at foot of Table X., p. 27.

None of these eight cases died.

Length of interval.

The several intervals between the re-vaccination and the small-pox were—7 years, 8 years, 15 years, 20 years, 22 years, 25 years, and 27 years. Thus it will be seen that the shortest interval was seven years.

(*d.*) *On the Power of Re-vaccination to protect from Infection.*

The re-vaccinated cases of small-pox are too few to draw any conclusion as regards its power to *modify* the disease over and above the power which primary vaccination is alleged to possess; but, in addition to the facts just

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* Vide Introduction.

† Table X., p. 27, *ante*. The workhouse, fever hospital, 4 common lodging and 14 other houses being excluded for reasons there stated.

TABLE XXIII.

The EIGHT CASES of SMALL-POX occurring among 2,535 Persons, living in 437 Infected Houses, who had been successfully Re-vaccinated more than 14 days before developing the Eruption.

No. of Case.	Book and Page.	Name and Age.	Primary Vaccination.	Date of Re-vaccination.	Result of Re-vaccination.	Date of Small-pox Eruption.	Type of Small-pox.	Result.	Interval between Re-vaccination and Small-pox.
491	$\frac{\text{IX.}}{14}$	B——, William, 42 - -	Infancy. 1 fov. II. ·282 sq. in. "Indiff. vacc."	1866 æt. 15.	Success - -	2nd Jan., 1893	Confluent	R.	27 years.
446	$\frac{\text{VII.}}{20}$	B——, Annie, 26 - -	Infancy. 2 fov. $\frac{\text{IV.}}{2}$ ·408 sq. in. "Indiff. vacc."	1873 æt. 6.	2 fov. $\frac{\text{IV.}}{2}$ -	6th Dec., 1892	Discrete -	R.	20 years.
439	$\frac{\text{XV.}}{25}$	H——, Chas., 38 - -	Infancy. 2 fov. $\frac{\text{IV.}}{2}$ ·408 sq. in. "Indiff. vacc."	1867 æt. 13.	2 fov. $\frac{\text{IV.}}{2}$ -	3rd Dec., 1892	" -	R.	25 years.
349	$\frac{\text{IX.}}{12}$	I——, Eliza, 38 - - -	Infancy. 3 fov. II. ·846 "Well vacc."	1884 æt. 30.	2 success. -	10th Nov., 1892	Mild	R.	8 years.
138	$\frac{\text{XV.}}{3}$	K——, Jas., 25 - - -	Infancy. 1 f. fov. IV. ·126 sq. in. Indiff. vacc.	1877 æt. 10.	1 w. fov. II. -	4th Oct. 1892 -	Discrete -	R.	15 years.
143	$\frac{\text{V.}}{13}$	D——, Herbert, 26 - -	Infancy. 3 fov. III. ·588 Well vacc.	1885 æt. 19.	3 success. No marks.	2nd Oct., 1892	Mild -	R.	7 years.
295	$\frac{\text{XIV.}}{6}$	A——, John, 37 - -	Infancy. 3 non. fov. IV. ·378 sq. in. "Indiff. vacc."	1870 æt. 15.	Successful. 3 non-fov. IV.	8th Nov., 1892	Discrete -	R.	22 years.
620	$\frac{\text{XVIII.}}{19}$	M——, Mary, 30 - -	Infancy. 1 fov. II. ·282 sq. in. Indiff. vacc.	1873* æt. 10.	1 fov. I.	18th Apr., 1893	Confluent	R.	20 years.

* Also suffered from small-pox at that time. *See* text above.

mentioned, there are certain other facts in the Warrington epidemic which point to the efficacy of revaccination as *protecting from infection.*

1. As we have seen, the attack-rate in the infected houses amongst these re-vaccinated was less than the attack-rate amongst those who had been protected by a previous attack of small-pox. The figures in Table X. (p. 26) in both columns are certainly small, but the similarity of the per-centages is a point worthy of note.

2. It is a fact of some importance that not one of all the 667 cases of small-pox had been successfully revaccinated more recently than seven years prior to the epidemic.

3. The only 2 members of the Aikin Street Hospital staff who were not re-vaccinated at the commencement of the outbreak were the only members of the staff who contracted small-pox.

4. The following are some instances where there exist reasons for believing that prompt *re-vaccination probably prevented spread* of the disease in an infected household.

Case 589 (f., æt. 18) was the only one of a family of eight persons who refused re-vaccination. All but this girl, the two youngest (æt. 2 and 5) had been re-vaccinated before the house became infected.

Case 624 (m., 23) similarly refused re-vaccination in November 1892. Six others of the family, all over 11 years of age, were done then and escaped, although two of them slept with the patient after the eruption came out.

Case 377 lived under very adverse hygienic conditions, and was one of a household of 16, ranging in age from 2 to 45 years. He was at home three days with the eruption out. All those (nine) over eleven were successfully re-vaccinated on the day the patient was removed, and no other member was subsequently attacked.

Cases 70, 175, 318, 444, 467, might also be mentioned as probable instances of the same efficacy.

5. Re-vaccination was performed extensively in the principal "Works" in the town, mostly at the expense of the employers, and in many the disease diminished or ceased to occur.

The works where the largest number of cases arose were the Dallam and Bewsey Ironworks (2,075 employees). During the 2nd and 3rd weeks of November it is estimated by Dr. Adams (the Medical Officer to the works) that some 1,400 or 1,500 of the men were re-vaccinated under circumstances already mentioned (p. 20, *ante*). The accompanying Table XXIV. shows the weekly number of men who developed the eruption, and it will be seen that there was a very considerable drop in the number of cases during and after the first and second weeks in December, *i.e.*, 14 days after re-vaccinations were performed. Indeed, only 12 cases occurred subsequently to the latter period of time, and up to May 10, and I was informed by the medical officer of health that these were men who had either refused re-vaccination or joined subsequently. The outbreak amongst these workmen, and the cause of the large number in week November 12, is dealt with more fully on p. 75.

6. *Troops.*—An average of 300 regulars and 200 militia are stationed at Warrington, and reside in the barracks at the north-east corner of the town. By the army regulations *all* recruits to the *regular troops* are re-vaccinated on joining; though *militia recruits*, the surgeon in charge informed me, are not re-vaccinated unless their marks are imperfect. In addition to these, 80 women and about 213 children reside in barracks, whose vaccination regulations are the same as for militiamen, making some 800 persons in all. At the time of the epidemic an inspection was made by the surgeon in charge, and re-vaccination performed wherever the original marks were reported not good.

Only one case of small-pox occurred (October 10, 1892), among these 800 persons, a militiaman,* whose primary marks were good, and who had not, therefore, ever been re-vaccinated. This gives an attack rate of ·12 per cent. in this well *re*-vaccinated community, as compared with 1·2 per cent. in the town generally.

Nor were any cases reported from the Police, nor in the Postal Service, in both of which re-vaccination was extensively practised either before or during the panic.

7. All the Aikin Street Hospital who were re-vaccinated escaped small-pox; but the two who were not re-vaccinated contracted the disease (p. 11).

Sub-section (*e*).—*Unsuccessful re-vaccination does not, as is sometimes believed, imply immunity from small-pox as the following list* (*Table XXV.*) *tends to show.*

The first of these cases was re-vaccinated at the Dallam and Bewsey forge with the other men, the lymph used being, Dr. Adams informed me, Renner's stored in tubes. The second and third were done at the Public Vaccination Station, and they were done by the Public Vaccinator, who generally uses the same lymph. The fourth person was admitted to the Small-pox Hospital by an error in diagnosis on March 15th, and was re-vaccinated on 17th and 19th by the Assistant Medical Officer of Health, both times with Renner's lymph in tubes. He left the hospital on March 30th, and developed the small-pox eruption on April 1st.

TABLE XXIV.

NUMBER of PERSONS working at the Dallam and Bewsey Forge who developed the eruption of small-pox each week.

Week ending	Cases notified from Dallam and Bewsey Forge.
August 27 - - -	2
September 3 - - -	2
" 10 - - -	0
" 17 - - -	0
" 24 - - -	1
October 1 - - -	1
" 8 - - -	3
" 15 - - -	4
" 22 - - -	4
" 29 - - -	4
November 5 - - -	3
" 12 - - -	36
" 19 - - -	4
" 26 - - -	5
December 3 - - -	1
" 10 - - -	1
" 17 - - -	0
" 24 - - -	1
" 31 - - -	2
January 7 - - -	1
" 14 - - -	0
" 21 - - -	0
" 28 - - -	1
February 4 - - -	0
" 11 - - -	0
" 18 - - -	0
" 25 - - -	0
During March - - -	2
During April - - -	5
To May 10, 1893 - -	0
Total - - -	83

TABLE XXV.

FOUR CASES of SMALL-POX unsuccessfully Re-vaccinated more than 14 days before the Eruption.

No. of Case.	Book and Page.	Name and Age.	Primary Vaccination.	Date of Re-vaccination.	Result of Re-vaccination.	Date of Small-pox Eruption.	Type of Small-pox.	Result.
639*a*	XVIII. 10	H——, Wm., 25 - - -	Infancy, 1 fov. II., ·282 sq. in., indifferently vaccinated.	Nov. 1892	Unsuccessful	12th April -	Mild -	R.
87	V. 23	H——, Alice, 35 - - -	Infancy, 3 fov. II., ·846, well vaccinated.	Sept. (?10) 1892	"	24th Sept. 1892	" -	R.
78	IV. 9	M——, Sarah, 13 - - -	Infancy, 4 good, "well vaccinated."	1891 æt. 11	"	21st Sept. 1892	" -	R.
574*a*	XIV. 33	B——, Joseph, 35 - - -	Infancy, 2 fov. III. ·392 sq. in., indifferently vaccinated.	March 17th and 19th, 1893	"	1st April 1893.	Discrete -	R.

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* J. G——, æt. 19, a mild case. He was isolated in the Army Hospital within the barracks. No secondary cases arose from this patient.

SECTION VII.—THE EFFECTS OF CONCURRENT VACCINIA AND VARIOLA ON EACH OTHER; THE EFFECT OF A PREVIOUS ATTACK OF VARIOLA ON VACCINIA; AND THE EFFECT OF A PREVIOUS ATTACK OF VARIOLA ON VARIOLA.

In the course of this inquiry certain instances have come to my notice which seem to bear on these questions; and first—Sub-section (*a.*) *Do Vaccinia and variola, being concurrent, have any reciprocal action on each other?*

(*a.*) Concurrent Vaccinia and Variola.

The following Table (XXVI.) gives a list of such cases:—

TABLE XXVI.

CASES of SMALL-POX occurring in PERSONS who had been SUCCESSFULLY or UNSUCCESSFULLY VACCINATED or RE-VACCINATED 14 days or less before the Eruption, arranged in order of interval between the Vaccination and the appearance of the Eruptions.

No. of Case.	Book and Page.	Name.	Age.	Date of Primary Vaccination.	Character of Primary Vaccination.	Date of Re-vaccination.	Result of Re-vaccination.	Date of Small-Pox Eruption and interval after Re-vaccination.	Type of Small-Pox.	Result.
80	II. 4.	L——, Walter	5	Unvaccinated until 20th Sept. 1892.			Successful	Sep. 21—1 day after	Confluent	R.
192	XI.	H——, Faith	36	Infancy	2 very faint II.	16th Oct. 1892	Successful	Oct. 18—2 days after	Mild	R.
35	VI. 9	W——, Maria	8	Unvaccinated until 5th Sept. 1892.			1 faint IV.	Nov. 7—2 „	Severe Discrete.	R.
282	VII. 17	W——, Joseph	26	Infancy	3 faint marks	4th Nov. 1892	2 successful	Nov. 7—3 days after	Mild	R.
375	V. 22	S——, Jas.	21	Infancy	2 fov. $\frac{\text{II.}}{\text{III.}}$	12th Nov. 1892	Successful	Nov. 15—3 „	Mild	R.
384	VIII. 6	P——, Florence	34	Infancy	1 fov. I.	13th Nov. 1892 21st Nov. 1892	2 successful	Nov. 24—3 days	Confluent	R.
182	II. 17	M——, Alice	b. Sept.	Unvaccinated until 11th Oct. 1892.			Unknown	Oct. 14—3 „	Confluent	D. Oct. 21
461A	XI. 13	E——, Mary	b. Dec. 8, '92.	Unvaccinated until 12th Dec 1892.			3 successful	Dec. 16—4 days	Confluent	D. Dec. 21
474	V. 7	T——, Henry	17 months	Unvaccinated until 15th Dec. 1892.			3 good vesicles	Dec. 19—4 „	Confluent	D. Dec. 21
406	XI. 14	M——, Jas.	20	Unvaccinated until 17th Nov. 1892.			3 good	Nov. 21—4 „	Confluent	R.
398	XII. 11	R——, Thos.	17	Infancy	2 fov. IV.	17th Nov. 1892	2 large marks	Nov. 23—6 days	Mild	R.
393	VIII. 15	W——, Mary	36	Infancy	2 wk. fov. II.	15th Nov. 1892	2 large vesicles	Nov. 21—6 „	Discrete	R.
174	IV. 12	W——, Martha	24	Infancy	2 marks	7th Oct. 1892	Unsuccessful	Oct. 13—6 „	Mild	R.
428	XI. 17	C——, John	23	Unvaccinated until 22nd Nov. 1892.			Successful	Nov. 28—6 „	Discrete	R.
21	VI. 6	B——, John	37	Infancy	2 good	24th Aug. 1892	Successful	Aug. 31—7 days	Mild	R.
516	VIII. 28	W——, Frank	26	Infancy	2 fov. II.	11th Jan. 1893	Successful	Jan. 18—7 „	Mild	R.
467	XIV. 13	C——, Eliz.	43	Infancy	2 fov. I.	6th Dec. 1892	2 good vesicles	Dec. 13—7 „	Discrete	R.
372	XIV. 27	B——, Wm.	15 days	Unvaccinated until 8th Nov. 1892			2 successful	Nov. 15—7 „	Confluent	D. Nov. 22
16	V. 20	L——, Agnes	48	Infancy	2 faint II.	23rd Aug. 1892	Successful	Aug. 31—8 days after.	Mild	R.
67	IV. 4	S——, Annie	22	Infancy	1 fov. II.	14th Sept. 1892	Unsuccessful	Sept. 22—8 days	Confluent	R.
394	VII. 6	T——, Mary	25	Infancy	2 good	12th Nov. 1892	Successful	Nov. 20—8 „	Very mild	R.
234	XI. 7	N——, Arthur	24	Infancy	3 fov. III.	18th Oct. 1892	2 successful	Oct. 26—8 „	Mild	R.
651	XIX. 2	O'B——, John	2	Unvaccinated until 2nd May			Successful	May 10—8 „	Mild	R.
432	XIII. 2	B——, Ruth	24	Infancy	3 fov. III.	24th Nov. 1892	3 successful	Dec. 2—8 „	Very mild	R.
520	VIII. 28	D——, Annie	28	Infancy	3 fov. I.	11th Jan. 1893	2 very typical vesicles.	Jan. 19—8 „	Discrete	R.
434	XV. 9	L——, Mary	32	Infancy	1 fov. II.	22nd Nov. 1892	2 successful	Nov. 30—8 „	Mild	R.

Table XXVI—*continued.*

No. of Case.	Book and Page.	Name.	Age.	Date of Primary Vaccination.	Character of Primary Vaccination.	Date of Re-vaccination.	Result of Re-vaccination.	Date of Small-Pox Eruption.	Type of Small-Pox.	Result.
643	XX./7	F——, John	33	Infancy	1 wk. fov. I.	20th April	2 successful	April 29—9 days after.	Semi-confluent.	R.
403	X./11	B——, Kate	25	Infancy	1 fov. I.	15th Nov. 1892	1 successful	Nov. 24—9 days after.	Mild	R.
395	X./12	P——, Margaret	31	Infancy	2 fov. II.	15th Nov. 1892	2 good vesicles	Nov. 24—9 days after.	Very mild	R.
252	I./2	B——, Joseph	25	Infancy	3 times, but did not take.	23rd Oct. 1892	3 good vesicles	Nov. 1—9 days after.	Mild	R,
549	V./25	S——, Percy*	b. Feb. 5th	Unvaccinated until 7th Feb. 1893 9th Feb. 1893			Uusuccessful Successful	Feb. 18—10 days after.	Very mild	D. Feb. 22
509	XIII./21	G——, Kate	35	Infancy	4 fov. III.	5th Jan. 1892	3 good vesicles	Jan. 15—10 days after.	Discrete	R.
442a	XV./25	H——, Annie	30	Infancy	2 f. fov. III.	23rd Nov. 1892	2 successful vesicles.	Dec. 3—10 days after.	Mild	R.
256	V./3	B——, Sarah	28	Infancy	2 f. fov. III.	22nd Oct. 1892	Unsuccessful	Nov. 1—10 days after.	Mild	R.
200	XI./2	H——, Frank	4	Unvaccinated until 9th Oct. 1892.			Successful	Oct. 19—10 days after.	Semi-confluent.	R.
56	V./12	C——, Hannah	10	Unvaccinated until 29th Aug. 1892			2 fov. II.	Sept. 9—11 days after.	Discrete	R.
421	VIII./35	T——, Sarah*	b. Nov. 18	Unvaccinated until 1st Dec. 1892 4th Dec. 1892			5 successful	Dec. 13—12 days after.	Very mild	R.
488	I/8	W——. Eliz.	36	Infancy	2 non-fov. IV. very faint.	15th Dec. 1892	Unsuccessful	Dec. 29—14 days after.	Very slight	R.
574*a*	XIV./33	B——, Jas.	35	Infancy	2 fov. III.	17 & 19th Mar.	Unsuccessful	April 1—13 and 15 days after.	Discrete	R.

* It seems very doubtful if these two cases suffered from small-pox. They are separately described on page 35 and below.

Remarks on Table XXVI.

Precise particulars as to kind of lymph and operator could not be obtained in all of these cases, but there seemed no reasonable doubt on this score. Many were done by the Public Vaccinator when he visited the infected house in his capacity of Medical Officer of Health. In all cases the lymph was nearly sure to be fresh.

The inference which this table suggests is that if vaccination be performed less than 12 days before the expected appearance of the small-pox eruption, it does not necessarily prevent an attack. Nor is there anything to show decisively that concurrent vaccinia modifies the course of the disease. It is true that in the first 10 cases of Table XXVI. there were 3 mild, 1 severe discrete, and 6 confluent; and in the next 22 (omitting unsuccessful cases), there were 4 very mild, 10 mild, 5 discrete, 2 semi-confluent, and 1 confluent. But it is also true that in the first group 6 of the cases were previously unvaccinated, while in the last group most of the cases had been vaccinated in infancy.

Conversely, there is nothing to show that the presence of the variolous poison within the system, during its period of incubation, in any way modifies the course of the vaccinia. The cases are not numerous, but they tend to show that, in order to be really efficacious as a preventive of small-pox, vaccination or re-vaccination must be performed not less than 12 days before the expected appearance of the small-pox eruption.

It will be seen from this table that—

4 cases developed the eruption of small-pox 7 days after successful vaccination or revaccination.

7 cases developed the eruption of small-pox 8 days after successful vaccination or re-vaccination.

4 cases (1 semi-confluent and 3 mild) developed the eruption of small-pox 9 days after successful re-vaccination; not including the doubtful case of S——, who had a few "pimples" on 9th day after successful vaccination. (See p. 35.)

2 cases developed the rash of mild and discrete small-pox 10 days after successful re-vaccination; and

1 case developed the rash of semi-confluent small-pox 10 days after successful primary vaccination,

1 case developed the rash of discrete small-pox 11 days after successful primary vaccination.

No one developed the eruption of small-pox 12 or more days after vaccination or re-vaccination, unless the infant (S. T.——), about to be mentioned, is to be regarded as a case of small-pox.

Included in Table XXVI. are two infants believed to have had abortive small-pox concurrently with vaccinia. They are marked with an asterisk.

1. The case of Percy S—— described on p. 35.

2. Sarah T——, (Case No. 421) was born Nov. 18th, 1892.

On Nov. 30th the mother developed the rash of discrete small-pox, and was removed with her unvaccinated baby to the Small-pox Hospital on Dec. 1st.

On Dec. 1st the baby was vaccinated by the Assistant Medical Officer of Health in five places, all of which were successful, giving ultimately 1¼ inch foveate area.

On or about Dec. 13th (*i.e.*, 12 days after the successful vaccination) five small "pimples" were observed, as I am informed, on the child's face. The Assistant Medical Officer of Health regarded these as due to abortive small-pox. The evidence, however, is not very conclusive.

The question as to whether these infants incurred small-pox rests entirely on the nature of the rash.

One of these children developed the pimples on the 9th and the other on the 12th day after successful primary vaccination. I did not see the eruption myself in either case, but looking to the liability of babies to develop eruptions of various kinds, especially after vaccination, when they are known as "vaccination rashes," and to the great severity with which small-pox occurs in children at this time of life, I am inclined to the view that they did not suffer from small-pox; and they are not included in the total 667 cases.

The only other tenable view is that they suffered from small-pox very considerably modified by a concurrent attack of vaccinia.

The facts so far as my information goes are here recorded.

Sub-section b.—On the Influence of Variola on Vaccinia.

TABLE XXVII.

CASES of SMALL-POX OCCURRING in PERSONS who had been SUCCESSFULLY or UNSUCCESSFULLY VACCINATED or RE-VACCINATED on DAY of DEVELOPMENT of the ERUPTION or at a later STAGE of the DISEASE.

No. of Case.	Book and Page.	Name.	Age.	Date of Primary Vaccination.	Character of Primary Vaccination.	Date of Small-pox Eruption.	Date of Re-vaccination.	Interval between Small-Pox Eruption and Vaccination.	Result of Re-vaccination.	Type of Small-pox.	Result.
69*a*	I. 2	B——, Alice -	14	Infancy	3 fov. I.	Nov. 21	Nov. 21	Same day -	No effect - -	Mild -	R.
442	XV. 25	H——, William -	4 months.	Unvaccinated.		Dec. 3	Dec. 3	Same day -	2 good vesicles -	Confluent	R.
502	XII. 24	H——, Anne -	46	Infancy	1 fov. III.	Jan. 11	Jan. 12	1 day after -	2 good vesicles. 2 cic. I.	Very slight	R
571	XIX. 18	M——, Elizabeth -	16	Ditto	2 fov. III.	Mar. 13	Mar. 14	1 day after -	Unsuccessful -	Very mild	R

With the View of throwing Light on the Question whether a previous attack of Small-pox exercises any Influence on Vaccinia, Tables XXVIII. and XXIX. are submitted.

TABLE XXVIII.

PERSONS SUCCESSFULLY or UNSUCCESSFULLY VACCINATED or RE-VACCINATED during and after Convalescence from SMALL-POX, contracted either during or previously to the WARRINGTON EPIDEMIC, 1892–3.

No. of Case.	Book and Page.	Name.	Age.	Date of Primary Vaccination.	Character of Primary Vaccination.	Date of Small-Pox eruption.	Type of Small-Pox.	Date of Revaccination.	Result of Re-vaccination.	Interval between Small-Pox eruption and Revaccination.
283	II. 30	M———, George -	42	Infancy -	2 fov. I. -	Nov. 7, 1892 -	Very mild.	20th November 1892.	Unsuccessful.	13 days.
318	III. 2	C———, Edward -	49	„ -	1 fov. II. -	Nov. 9, 1892 -	Very mild	November 25th 1892.	Did not take.	15 days.
39	IV. 16	B———, Arthur -	15	„ -	2 fov. I. -	Sept. 8, 1892 -	Slight -	2 or 3 weeks after recovery.	Unsuccessful.	2 or 3 weeks.
30*a*	VII. 11	M———, Agnes -	21	„ -	3 fov. II. -	Aug. 20, 1892 -	Mild -	In September 1892.	„	1 month.
424	IV. 14	H———, Wm. H. -	30	„ -	2 marks -	Nov. 10, 1892 -	„ -	December 1892 -	„	About 1 month.
44	V. 4	K———, Alice -	24	„ -	2 fov. cic. I. very good marks.	Sept. 9, 1892 -	„ -	1 or 2 months after recovery.	„	1 or 2 months.
8	V. 1	C———, Emanuel	16	„ -	3 fov. IV. -	Aug. 18, 1892 -	„ -	November 1892 -	„	About 3 months.
0	X. 23	H———, Richard	56	„ -	Good -	1836 as baby -	Face pitted.	5 times in army	All unsuccessful.	5 times at varying intervals.
0	XII. 25	S———, Francis -	42	„ -	1 fov. IV. -	1861, æt. 11 -	Deeply pitted.	7 times in army	All unsuccessful.	7 times at varying intervals.
0	XII. 7	B———, Sarah -	29	„ -	3 fov. I. (nearly).	1873 - -	Mild -	31st October 1892.	Successful (2 fov. IV.)	19 years.
0	XV. 21	G———, Sarah -	47	„ -	1 fov. II. -	1862, æt. 17 -	Much pitted.	15th November 1892.	2 successful.	30 years.
0	XIV. 11	A———, James -	59	„ -	3 f. fov. IV. -	1848, æt. 15 -	Some pitting.	4th December 1892.	2 successful.	44 years.

Table XXIX.

The Effect of Vaccination on Children born of Mothers who suffered from Small-pox during Gestation.

Book Reference.	Name of Patient.	Age.	Date of Rash.	Date of leaving Hospital.	Type of Mother's Case.	Period of Gestation at Advent of Small-pox.	Date of Confinement.	Effects of Vaccination in Child.
256 V. 3	B——, Sarah	28	Nov. 1	Nov. 22	Mild	6 months	Feb. 10, 1893.	Twins vaccinated three times when about 3 months old by Public Vaccinator unsuccessfully.
61 VII. 9	W——, Annie	27	Sept. 13	Oct. 28	Severe discrete	7 months	Oct. 20, 1892.	Vaccinated Oct. 21, 1892, by Dr. Fox in two places, Nov. 7, 1892, resulting in one tiny flat mark measuring ·031 square inch.
XV. 13	N——, Ann	21	Nov. 26	—	Confluent	5 months	Mar. 31, 1893.	Vaccinated at four different times, twice by myself; never successful.

Note.—A case of the same class is mentioned on p. 35 (*ante*), P. S.——

As regards the lymph used in the instances mentioned in Tables XXVII., XXVIII., and XXIX., it was a little difficult to get precise particulars as they were nearly all done during the panic and no records kept. But there seemed no reason for suspecting the freshness of the lymph or the efficiency of the operation in any case. It was the practice of the Medical Officer of Health, who is also Public Vaccinator, on going to see a notified case of small-pox to vaccinate the other inmates of the house at once or very soon afterwards, and he informed me that it was his practice then to use Renner's calf lymph stored in tubes. At the Public Vaccination Station, he vaccinated from arm to arm.

As regards Table XXVII.:—

Case 69*a* was done by a private doctor, so also was 442.

Cases 502 and 571 were done in hospital by the Assistant Medical Officer of Health, who uses the same kind of lymph as the Public Vaccinator.

As regards Table XXVIII, the first three were done by private practitioners. Two were done in the army, and the remainder were done at the Public Vaccination Stations, where, at that time, fresh tube-stored calf lymph was used.

As regards Table XXIX., all were done with fresh Renner's lymph stored in tubes, and great care was taken to secure the efficiency of the operation. One of the cases was vaccinated twice unsuccessfully by myself with fresh Renner's calf lymph stored in tubes.

A study of these cases *suggests*:—

1. That if a pregnant woman contracted small-pox during gestation, the child after birth is unsusceptible to vaccination, or, if susceptible, is only very slightly so. Possibly the child contracts small-pox in utero, but none of these children were born pitted.

2. None of these children contracted small-pox after birth, though one was born in hospital. It would therefore seem that a similar immunity to this disease is also produced by small-pox in the mother during gestation.

Sub-section c.—Influence of Variola on Variola.

There were five out of the 667 cases in which satisfactory evidence was obtained that they had previously suffered from an attack of small-pox. They are presented in detail in Table XXX. Much care is required in accepting statements on this subject of previous small-pox. The value of the different kinds of evidence has been discussed on p. 23, *ante*.

The only remarks which this table calls for are—

1. That the shortest interval between the two attacks in any individual was 19 years; and
2. That the attack-rate amongst those exposed, in the infected houses, was higher amongst those who had previously had small-pox than amongst those who had been re-vaccinated (*vide* Table X., *ante*).

Table XXX.

Giving Particulars of Five Persons previously attacked by Small-pox who also incurred an Attack in 1892–93.

Case.	Reference No.	Name.	Age at First Attack of Small-pox.	If marked by First Attack.	Age at Second Attack of Small-pox.	Type of Small-pox Second Attack.	Particulars as to Primary Vaccination.	Re-vaccination.
216	XII. 16	B——,	Infancy	Marks on shoulder	32 years	Very mild	Infancy, 3 fov. $\frac{1\ \text{I.}}{2\ \text{II.}}$	Never.
310	XII. 27	H——, Thos.	2 weeks old	Marked	39 „	Discrete	Unvaccinated	„
351	III. 10	G——, John	12 months	Pits on face and arms.	27 „	Mild	Infancy, 2 fov. I.	„
453	II 32	T——, Caroline	10 years	Pits on face and arms.	29 „	„	10 years old. 2 faint fov. III.	„
620	XVIII. 19	*M——, Mary	Before 10 years	If marked, marks covered by second attack.	30 „	Confluent	Infancy, 1 fov. II.	æt. 10 (1873), successfully vaccinated (1 fov. I.)

* Full particulars of this case are given on p, 43, *ante*,

TABLE XXXI.

SHOWING the VACCINATED CONDITION of 2,535 Persons exposed to Infection in 437 infected houses at the different age periods; the ATTACK-RATE in each, and the FATALITY of the disease. 618 cases arose in these houses (*vide* footnote).

—	Age period, 0–10. 688 persons, 58 cases.						Age period, 10–20. 681 persons, 162 cases.						Age period, 20–30. 475 persons, 222 cases.						Age period, 30—40. 286 persons, 111 cases.						Age period, 40—50. 229 persons, 42 cases.						Age period, 50—60. 127 persons, 16 cases.						Age period, 60 and upwards. 49 persons, 7 cases.					
	Well Vaccinated.	Indifferently Vaccinated.	Doubtfully Vaccinated.	Unvaccinated.	Revaccinated.	Previous Small-pox.	Well Vaccinated.	Indifferently Vaccinated.	Doubtfully Vaccinated.	Unvaccinated.	Revaccinated.	Previous Small-pox.	Well Vaccinated.	Indifferently Vaccinated.	Doubtfully Vaccinated.	Unvaccinated.	Revaccinated.	Previous Small-pox.	Well Vaccinated.	Indifferently Vaccinated.	Doubtfully Vaccinated.	Unvaccinated.	Revaccinated.	Previous Small-pox.	Well Vaccinated.	Indifferently Vaccinated.	Doubtfully Vaccinated.	Unvaccinated.	Revaccinated.	Previous Small-pox.	Well Vaccinated.	Indifferently Vaccinated.	Doubtfully Vaccinated.	Unvaccinated.	Revaccinated.	Previous Small-pox.	Well Vaccinated.	Indifferently Vaccinated.	Doubtfully Vaccinated.	Unvaccinated.	Revaccinated.	Previous Small-pox.
Of 2,535 people in infected houses there were -	484	133	16	55	0	0	460	168	16	19	17	1	279	140	20	14	19	3	131	102	20	7	12	14	117	76	15	5	8	8	38	61	9	6	4	9	14	21	4	1	3	6
Of whom 618 contracted small-pox - - -	18	9	1	30	0	0	114	32	3	13	0	0	135	66	7	9	3	2	36	56	7	6	3	3	19	15	5	2	1	0	7	8	1	0	0	0	0	6	1	0	0	0
Case incidence per cent. -	*3·72*	*6·77*	*6·25*	*54·54*	*0*	*0*	*24·78*	*19·05*	*18·75*	*68·42*	*0*	*0*	*48·39*	*47·14*	*35·00*	*64·29*	*15·77*	*66·6*	*27·48*	*54·90*	*35·00*	*85·71*	*25·00*	*21·42*	*16·24*	*19·74*	*33·33*	*40·0*	*12·5*	*0*	*18·42*	*13·11*	*11·11*	*0*	*0*	*0*	*0*	*28·57*	*25·00*	*0*	*0*	*0*
58 deaths - - -	0	2	0	11*	0	0	1	0	0	2	0	0	2	5	3	3	0	0	3	7	4	4	0	0	3	2	3	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0
Case mortality per cent. -	*0*	*22·2*	*0*	*36·6*	*0*	*0*	*0·8*	*0*	*0*	*15·4*	*0*	*0*	*1·5*	*7·6*	*42·8*	*33·3*	*0*	*0*	*8·3*	*12·5*	*57·1*	*66·6*	*0*	*0*	*15·8*	*13·3*	*60·0*	*50·0*	*0*	*0*	*14·3*	*0*	*0*	*0*	*0*	*0*	*0*	*16·6*	*0*	*0*	*0*	*0*

NOTE.—The Workhouse, Fever Hospital, Common Lodging-Houses, and 14 other houses whose inmates could not be traced, are excluded from this table, as it was not possible to obtain the facts as to vaccination of the other inmates in these with the same degree of accuracy as in the remaining 437 houses: 20 houses containing 49 cases are therefore excluded.

SECTION VIII.—THE DURATION OF PROTECTION FROM, AND MODIFICATION OF SMALL-POX, AFFORDED BY PRIMARY VACCINATION.

This subject may be approached by an inquiry into the attack-rate at different age-periods among the vaccinated and unvaccinated persons exposed (*i.e.*, duration of power to protect); the severity of small-pox and case-mortality at different age-periods among the vaccinated and unvaccinated cases (*i.e.*, duration of power to modify); and, lastly, by a detailed examination of the vaccinated and unvaccinated cases of small-pox under 10 years of age, and at each succeeding decade of life. Table XXXI., page *ante*, gives a minute analysis of the data available. But it will be advisable, as before, to consider the alleged *protecting* power and the alleged *modifying* power separately.

Sub-section a.—Duration of power to protect against attack.

The following tables (XXXII. and XXXIII.) showing the attack-rate at different age-periods among the vaccinated and unvaccinated persons examined in the infected houses, are now submitted.

The heaviest attack-rate (47 per cent.) among the vaccinated persons is in the third decade of life (20–30), which is more than twice that of the decade below. Next comes the fourth decade (30–40) with 39 per cent., then in order—the second decade (23 per cent.), fifth, seventh, sixth, and lastly the first decade with an attack-rate of only 4 per cent.

The gradual decline in the attack-rate in the fourth, fifth, seventh, and sixth decades may probably be accounted for by the increasing immunity from attack by nearly all infectious diseases which seems to be conferred on advancing years.

The comparative immunity (4 per cent.) from attack amongst persons exposed in the 0–10 decade of life may be accounted for by vaccination (Section II., page 26).

The heavy incidence in the 20–30 decade seems to show that the protective power of primary vaccination to a considerable extent wears off after 20.

TABLE XXXII.

SHOWING the ATTACK-RATE at different AGE-PERIODS amongst 2,324 VACCINATED Persons in the 437 Infected Houses, in which 546 cases arose.

—	Age-periods.						
	(1.) 0-10.	(2.) 10-20.	(3.) 20-30.	(4.) 30-40.	(5.) 40-50.	(6.) 50-60.	(7.) 60 and upwards.
1,523 well vaccinated persons - -	484	460	279	131	117	38	14
701 indifferently vaccinated persons -	133	168	140	102	76	61	21
100 doubtfully vaccinated persons -	16	16	20	20	15	9	4
2,324 total of three vaccinated classes in infected houses - - - -	633	644	439	253	208	108	39
Among whom 546 cases occurred - -	28	149	208	99	39	16	7
Per-centage of people at that age attacked =attack-rate - - -	*4·4*	*23·1*	*47·4*	*39·1*	*18·7*	*14·8*	*17·9*

NOTE.—The revaccinated, and those protected by a previous attack of small-pox are excluded from this table.

TABLE XXXIII.

GIVING the ATTACK-RATE at different age-periods among the 107 UNVACCINATED persons exposed in the 437 infected houses, for comparison with Table XXXII.

—	Age-periods.						
	(1.) 0–10.	(2.) 10–20.	(3.) 20–30.	(4.) 30–40.	(5) 40–50.	(6.) 50–60.	(7.) 60 and upwards.
107 unvaccinated persons exposed in these houses.	55	19	14	7	5	6	1
60 unvaccinated persons attacked in these houses.	30	13	9	6	2	0	0
Per-centage of persons attacked (attack-rate)	*54·5*	*68·4*	*64·3*	*85·7*	*40·0*	*0*	*0*

Sub-section (b.) The duration of modifying power over Small-Pox afforded by Primary Vaccination.

Table XXXIV. presents an analysis of 586 persons who, having been vaccinated in infancy and not since, contracted small-pox during the Warrington epidemic, 1892–93, and shows the relative severity and case-mortality at the different age-periods of life.

1. A study of these figures shows that the *case-mortality* among the vaccinated cases is *6·5* per cent., that among the unvaccinated cases being *35·3* per cent. One death in each of the first two decades of life should not really be included as due to small-pox. From these figures it would seem that no one under 20 who has been vaccinated in infancy need have very much fear of dying from small-pox *per se.* At any rate, it would seem that the power of vaccination over the fatality of small-pox is good (though it diminishes gradually) up to 40. Though even in the fifth decade the modifying power is not entirely lost, if comparison be made with the unvaccinated figures given below, and those of other observers (p. 55).

2. The *severity of the disease* in the vaccinated (primary vaccination only) as measured by the proportion of confluent cases, steadily rises, and more uniformly, up to the same decade (40–50), which again is the highest, and then falls.

This fact tallies with and confirms the preceding one.

Thus, on both grounds (case-mortality and case-severity) the power of vaccination to modify small-pox would seem to last longer by some 20 years than its power to protect from infection; for the power to *modify* is least in the 5th decade, and the power to *protect* (Table XXXII.) is least in the 3rd decade.

Table XXXV. gives a similar analysis of the unvaccinated cases in Warrington in 1892–93 for comparison with Table XXXIV.

The figures in Tables XXXIV. and XXXV. have the merit of being based on persons living side by side in the infected houses, under precisely the same environments in all respects.

Important data as to the age when re-vaccination should be performed may be deduced from the foregoing observations, in Sub-sections *a* and *b*.

HISTORICAL

We have not an exact record of the number, age, and type of all the cases which arose during the epidemic of 1773 so that the attack-rate, case-severity, and case-mortality, at different age-periods of that outbreak cannot be numerically expressed; but thanks to Dr. Percival we have (p. 37, *ante*) a very exact table recording the ages of the fatal cases.

It is unnecessary to repeat here the comments on this table, but, if we bear in mind that, owing to the endemic prevalence of small-pox in those times, almost every inhabitant who survived the early years of existence grew up protected by an attack of the disease, it will be seen that the facts there set forth tally with those just now mentioned, and the conclusion is irresistible that it was vaccination which afforded protection against, and modification of, small-pox in the earlier decades of life in the epidemic of 1892–3.

Sub-section (c.) Cases of Small-pox in Children under 10.

Next let us consider in detail the cases of small-pox which occurred in the first decade of life. Tables XXXVI. and XXXVII. give full particulars of these cases, vaccinated and unvaccinated respectively (pp. 52 and 53).

TABLE XXXIV.

SHOWING the CASE-TYPE and CASE-MORTALITY at different Age-periods among the 586 Persons PRIMARILY VACCINATED who contracted SMALL-POX. (Total number.)

—	Age-periods.						
	(1.) 0–10.	(2.) 10–20.	(3.) 20–30.	(4.) 30–40.	(5.) 40–50.	(6.) 50–60.	(7.) 60 and upwards.
321 mild cases - - - - -	24	108	121	46	13	6	3
137 discrete cases - - - - -	7	38	46	25	10	7	4
128 confluent cases, including malignant or hæmorrhagic.	2	10	55	39	17	4	1
586 total cases - - - - -	33	156	222	110	40	17	8
38 deaths - - - - -	2*	1†	10	14	9	1	1
Case-mortatity (per-centage) - -	*6·0*	*0·6*	*4·5*	*12·7*	*22·5*	*5·9*	*12·5*
Case-severity, as shown by per-centage of confluent cases.	*6·0*	*6·4*	*24·8*	*35·5*	*42·5*	*23·5*	*12·5*

NOTE.—The re-vaccinated, and those persons who had previously incurred an attack of small-pox, are excluded from this table.

* One of these cases, 607, æt. nine years and two months, was at the time ill with inflammation of the lungs and bowels, and the small-pox was only a contributory cause of death (p. 34).

† This young man (case 117) had recovered from the small-pox, and then incurred pyæmia, from which he is certified as dying (p. 34).

TABLE XXXV.

SHOWING the CASE-TYPE and CASE-MORTALITY at different age-periods among the 68 UNVACCINATED cases of SMALL-POX in the Warrington epidemic, 1892–3. (Total number—eight arose in the excluded houses, *vide* p. 22.)

—	Age-periods.						
	(1.) 0–10.	(2.) 10–20.	(3.) 20–30.	(4.) 30–40.	(5.) 40–50.	(6.) 50–60.	(7.) 60 and upwards.
3 mild cases - - - - -	2	0	1	0	0	0	0
17 discrete cases - - - - -	7	8	0	1	1	0	0
48 confluent, malignant, and hæmorrhagic cases.	23	10	9	5	1	0	0
68 total cases - - - - -	32	18	10	6	2	0	0
24 fatal cases - - - - -	12	3	4	4	1	0	0
Case mortality (per-centage) - -	*37·5*	*16·6*	*40·0*	*66·6*	*50·0*	*0*	*0*
Case severity (per-centage of confluent cases).	*71·9*	*55·5*	*90·0*	*83·3*	*50·0*	*0*	*0*

Table XXXVI.

Giving Particulars of 33 Cases of Small-pox occurring in Vaccinated Children under 10 Years of Age, who had been Primarily Vaccinated.

No.	Name.	Sex.	Age.	Date of				Attack.		Primary Vaccination.				Remarks.
											Marks.			
				On-set.	Rash.	Re-moval to Hos-pital.	Ter-mina-tion.	Type.	Result.	Date.	No.	Character.	Area.	
$\frac{\text{IV.}}{1}$ 3	L——, Hettie	F.	9	—	Aug. 18	Already in H.	Sep. 13	Slight -	Recov.	Infancy	1	Fov. cic. -	III.	
$\frac{\text{V.}}{4}$ 5	A——, Josiah	M.	4	—	Aug. 19	Never	5 weeks	Mild -	„	„	1	„ -	II.	
$\frac{\text{VI.}}{15}$ 26	S——, Walter	M.	9	—	Aug. 30	Sep. 21	—	„ -	„	„	3	Fov. -	IV.	
$\frac{\text{VI.}}{4}$ 25	B——, Thomas	M.	9	Sep. 2	Sep. 4	Sep. 19	—	„ -	„	„	1	Fov. cic. -	IV.	
$\frac{\text{II.}}{3}$ 75	L——, James	M.	8	Sep. 18	Sep. 20	Sep. 22	Sep. 29	Confluent	Died	—	—	—	—	
$\frac{\text{IV.}}{23}$ 55*a*	J——, Ada -	F.	9	—	Dec. 12	InHosp.	—	Slight -	Recov.	Infancy	1	Fov. -	III.	Was convalescing from scarlet fever at the time.
$\frac{\text{VI.}}{19}$ 77	P——, Henry	M.	7	Sep. 20	Sep. 22	Sep. 23	Oct. 26	Mild -	„	„	3	Faint fov.	II.	
$\frac{\text{VII.}}{18}$ 81	W——, Josiah	M.	9	Sep. 19	Sep. 22	Sep. 23	Nov. 15	Discrete -	„	„	—	Marks -	—	
$\frac{\text{II.}}{10}$ 85	P——, Annie	F.	8	Sep. 18	Sep. 23	Sep. 24	—	„ -	„	„	2	Fov. -	II.	
$\frac{\text{V.}}{12}$ 113	C——, Arthur	M.	5	Sep. 24	Sep. 26	Sep. 30	Oct. 15	Mild -	„	„	2	„ -	I.	
$\frac{\text{XIV.}}{28}$ 106	M——, Emily	F.	4	—	Sep. 28	Sep. 30	—	Very mild	„	„	2	„ -	$\frac{\text{IV.}}{\text{III.}}$	
$\frac{\text{V.}}{23}$ 124	H——, Edith	F.	9	Sep. 21	Sep. 28	Oct. 2	Nov. 21	Discrete -	„	„	2 1	„ - „ -	IV. II.	
$\frac{\text{V.}}{13}$ 129	W——, William.	M.	9	Oct. 1.	Oct. 2	Oct. 2	Oct. 9	Very mild	„	„	4	Marks -	—	
$\frac{\text{V.}}{24}$ 125	H——, Lilly -	F.	7	Oct. 1	Oct. 11	Oct. 2	Nov. 13	„ -	„	„	3	Faint fov.	II.	
$\frac{\text{XVI.}}{1}$ 173	P——, Nellie	F.	6	—	Oct. 14	Never	10 days.	Mild -	„	„	2	Fov. -	$\frac{\text{II.}}{\text{IV.}}$	
$\frac{\text{IX.}}{1}$ 215	H——, Richard.	M.	7	Oct. 19	Oct. 23	Oct. 24	2 wks.	Very mild	„	„	3	Good marks	—	
$\frac{\text{XV.}}{37}$ 220	R——, Lilly -	F.	6	—	Oct. 23	Oct. 25	8 days	Mild -	„	„	3	„ -	—	
$\frac{\text{VII.}}{15}$ 281	W——, Alice	F.	7	Nov. 2	Nov. 3	Nov. 8	Dec. 5	Discrete -	„	„	3	Marks -	—	
$\frac{\text{IV.}}{2}$ 302*a*	M——, Annie	F.	7	—	Nov. 9	In Hosp	Dec. 5	„ -	„	„	2	Plane -	IV.	
$\frac{\text{X.}}{25}$ 337	H——, John-	M.	8	Nov. 11	Nov. 11	Never	—	Very mild	„	„	3	Good marks	—	
$\frac{\text{II.}}{16}$ 376*a*	L——, Joseph	M.	8	—	—	—	—	Mild -	„	„	2	Good marks	—	
$\frac{\text{II.}}{16}$ 377*a*	L——, John -	M.	4	—	—	—	—	„ -	„	„	1	Fov. -	II.	
$\frac{\text{XIII.}}{14}$ 415	M——, Catherine.	F.	8	Nov. 25	Nov. 28	Nov. 29	—	„ -	„	„	3	Faint fov.	IV.	
$\frac{\text{XIII.}}{14}$ 416	M——, John	M.	6	Nov. 25	Nov. 28	Nov. 29	—	Very mild	„	„	3	Deep, 2; cic., 1; scars.	$\frac{\text{II.}}{\text{IV.}}$	
$\frac{\text{VIII.}}{13}$ 475	H——, Samuel	M.	9	Dec. 16	Dec. 18	Dec. 19	—	„ -	„	„	3	Fov. -	II.	
$\frac{\text{XII.}}{17}$ 507	B——, John -	M.	9	—	Jan. 15	Jan. 16	—	Mild -	„	„	3	„ -	III.	
$\frac{\text{XIV.}}{29}$ 538	P——, Sarah	F.	9	Feb. 4	Feb. 5	Feb. 6	—	„ -	„	„	3	Good marks	—	
$\frac{\text{XVIII.}}{17}$ 564	B——, David	M.	7	—	Mar. 10	Mar. 10	—	„ -	„	„	3	Fov. -	III.	
$\frac{\text{XIX.}}{24}$ 568	H——, Marion	F.	5	—	Mar. 11	Mar. 11	—	Very mild	„	„	4	Fov. -	III.	
$\frac{\text{XIX.}}{29}$ 580	R——, Eliz. -	F.	9	—	Mar. 22	Mar. 24	—	Mild -	„	„	2	„ -	I.	
$\frac{\text{XVIII.}}{19}$ 607	M—— John	M.	9	Apr. 1	Apr. 4	Apr. 6	Apr. 21	Confluent	Died -	„	2	Small mrks.	—	When he caught small-pox, was ill with inflammation of bowels and lungs, of which he died.
$\frac{\text{XIX.}}{15}$ 617	M——, Jane	F.	8	—	Apr. 14	Apr. 16	—	Discrete -	Recov.	„	3	Fov. cic. -	III.	
$\frac{\text{XVIII.}}{20}$ 631	C——, Kate -	F.	7	Apr. 20	Apr. 22	Apr. 24	—	„ -	„	„	3	Good marks	—	

Table XXXVII.

Giving Particulars of 32 Cases of Small-Pox occurring in Unvaccinated Children under 10 Years of Age.

Book Reference.	No.	Name.	Sex.	Age.	Date of				Attack.		Primary Vaccination.	Remarks.
					On-set.	Rash.	Removal to Hospital.	Termination.	Type.	Result.		
VI. 9	35	W——, Maria	F.	8	Sep. 5	Sep. 7	Sep. 19	Nov. 2	Severe discrete.	Recvd.	Unvaccinated	Vaccinated 2 days before rash, 1 faint IV.
II. 4	80	L——, Walter	M.	5	Sep. 18	Sep. 21	Sep. 22	—	„	Recvd.	„	Vaccinated 1 day before rash.
XII. 6	152	B——, Joseph	M.	7	Oct. 4	Oct. 6	Oct. 9	—	„	„	„	
XIV. 26	147	H——, Joseph	M.	5	Oct. 4	Oct. 7	Oct. 8	—	Discrete	„	„	
II. 17	182	M——, Alice	F.	10 days	Oct. 11	Oct. 14	Oct. 17	Oct. 21	Confluent	Died	„	Vaccinated 3 days before rash.
XI. 2	200	H——, Frank	M.	4	Oct. 16	Oct. 19	Oct. 19	—	Semi-confluent.	Recvd.	„	Vaccinated 10 days before rash.
XIII. 7	260	M——, Sarah	F.	8	—	Oct. 20	Never	Nov. 3	Confluent	Died	„	
X. 2	218	K——, Michael	M.	5	Oct. 20	Oct. 22	Oct. 23	—	„	Recvd.	„	
X. 8	217	H——, George	M.	8	Oct. 20	Oct. 23	Oct. 24	—	„	„	„	
XIV. 22	280	T——, John	M.	8	Nov. 4	Nov. 6	Nov. 7	—	„	„	„	
I. 5	348	H——, Anne	F.	10 days	—	Nov. 10	Never	Nov. 14	Discrete	Died	„	
XIV. 27	372	B——, William	M.	15 days	—	Nov. 15	Nov. 17	Nov. 22	Confluent	„	„	Vaccinated 7 days before rash.
II. 25	371	K——, Thomas	M.	9	Nov. 13	Nov. 16	Nov. 20		„	Recvd.	„	
IV. 14	426	H——, Gladys	F.	1 month	—	Nov. 17	Never	Dec. 6	„	Died	„	
XV. 1	391	M——, Mary	F.	4	—	Nov. 18	In hospital.	Nov. 30	„	„	„	
XV. 8	390	M——, William	M.	3	Nov. 18	Nov. 20	Nov. 24	Nov. 28	„	„	„	
V. 21	417	T——, Joseph	M.	6	Nov. 26	Nov. 28	Never	Dec. 28	Discrete	Recvd.		
XIV. 19	422	H——, Thomas	M.	5	Nov. 26	Nov. 28	Dec. 2	—	Discrete, abcesses during convalescence.	„	„	
XI. 17	428	C——, John	M.	5	Nov. 25	Nov. 28	Dec. 2	—	Discrete	„	„	
XV. 25	442	H——, John	M.	15 weeks	—	Dec. 3	Dec. 26	—	Confluent	„	„	Vaccinated same day as rash, 2 good vesicles.
XV. 11	459	M——, Austin	M.	9	Dec. 4	Dec. 7	Dec. 13	—	„	„	„	
XI. 13	461*a*	E——, Mary	F.	13 days	—	Dec. 16	Dec. 12	Dec. 21	„	Died	„	Vaccinated same day as removal 3 successful.
XV. 14	471	C——, John	M.	13 days	—	Dec. 14	Dec. 16	Dec. 16	„	„	„	
V. 7	474	T——, Henry	M.	17 months	—	Dec. 19	Dec. 19	Dec. 21	„		„	Vaccinated four days before rash
V. 4	487	M——, Stanley	M.	4	—	Jan. 1	Jan. 1	—	Semi-confluent.	Recvd.	„	
XIV. 7	517	B——, Sarah	F.	9	—	Jan. 21	Jan. 22	—	Confluent	„	„	Vaccinated on the day after rash.
XVI. 21	553	C——, Mary	F.	2 years 8 months	—	Feb. 23	Feb. 23	—	Discrete	Recvd.	„	
XVIII. 23	642	D——, William	M.	11 weeks	Apr. 25	Apr. 26	Apr. 30	—	Confluent	„	„	
XIX. 2	651	O'B——, John	M.	2	May 6	May 10	May 12	—	Mild	„	„	
XIII. 33	157	G——, Rob.	M.	1 month	Oct. 8	Oct. 8	Oct. 10	Oct. 12	Confluent	Died	„	
VI. 13	19	M——, James	M.	20 days	Aug. 29	Aug, 30	—	Sep. 6	„	„	„	
XX. 11	556	G——, Annie	F.	8	Feb. 23	Feb. 24	Feb. 26	—	Very mild	„	—	

Remarks on Tables XXXVI. and XXXVII.

There were in all 65 cases in persons under 10 years of age [*i.e.*, *10 per cent*. of all the cases (667)].

The following Table XXXVIII. shows a comparison of the vaccinated and unvaccinated cases at this age. 33 of these were vaccinated and 32 were unvaccinated.

The facts referring to protection from, and modification of small-pox revealed in the previous sections of this report receive confirmation from these particulars.

But, in order to arrive at some idea of the duration of such protection and modification in the earlier period of life, I have made the following analysis of the ages of the cases in the first decade of life (Table XXXIX.). It shows also the number of persons exposed at that age, and the type of the case. (*Remarks and Conclusions continued on p.* 55.)

TABLE XXXVIII.

GIVING a COMPARISON between SMALL-POX as it occurred in the 33 VACCINATED CASES and the 32 UNVACCINATED CASES under 10 years of age in the Warrington Epidemic, 1892–93, these being all that were known to occur in the respective Groups.

—	Attack Rate.	Case Severity.			Deaths.	Per-centage Fatality.
		Actual Number of Cases of—				
	Per-centage of Persons attacked among Persons exposed in the Infected Houses at that Age.	Mild.	Discrete.	Confluent, Hæmorrhagic, Malignant.		
33 vaccinated cases under 10 - -	*5·1*	24	7	2	2	*6·0*
32 unvaccinated cases under 10 -	*56·1*	2	7	23	12	*37·5*

TABLE XXXIX.

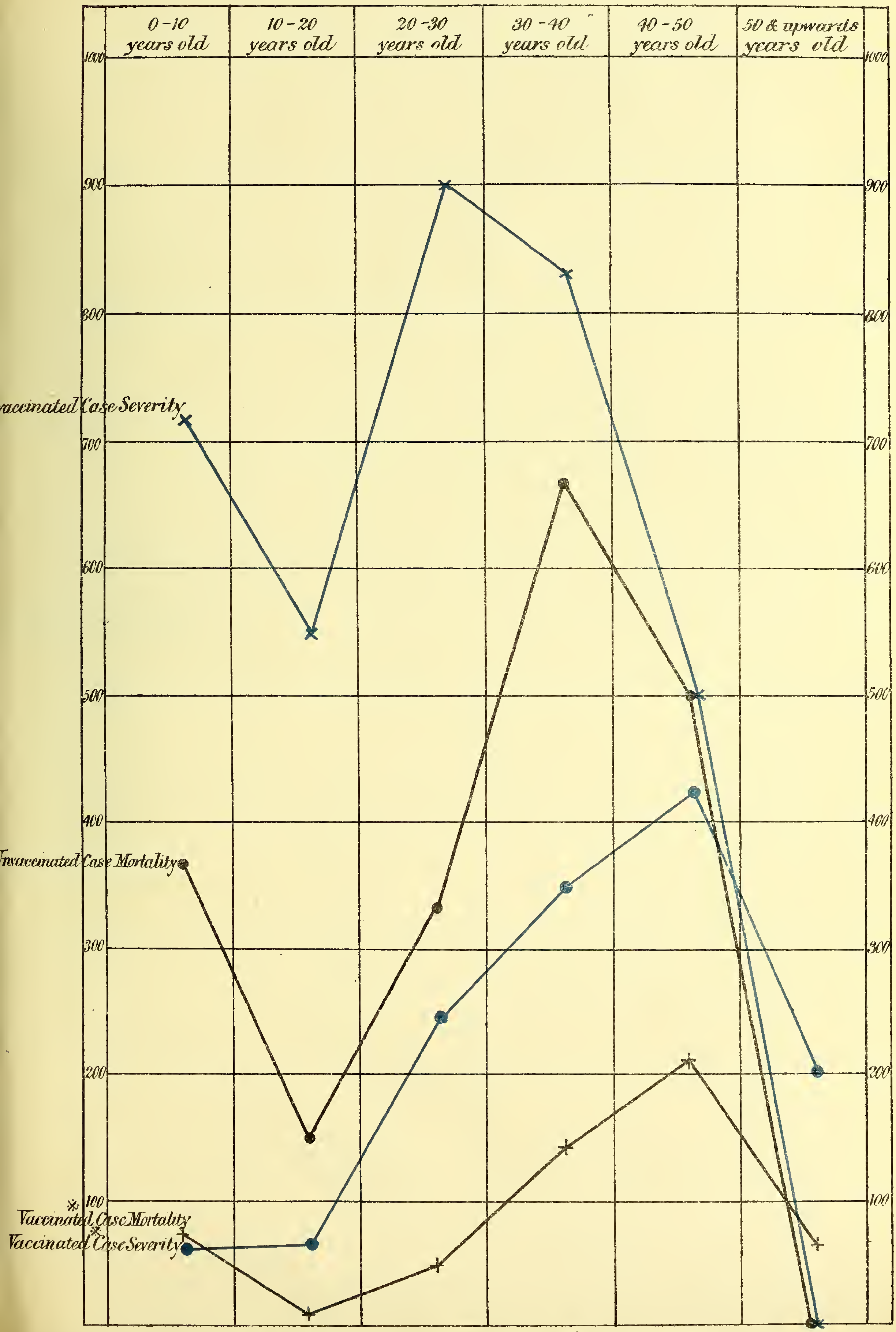
GIVING the AGE-PERIODS of the 33 VACCINATED and the 32 UNVACCINATED CASES of SMALL-POX under 10 years of age (being all that occurred in the Warrington 1892–93); showing also their type, fatality, and number of persons exposed to infection **in the Infected Houses.**

—	**Vaccinated**, and **doubtfully Vaccinated** Persons.					**Unvaccinated** Persons.				
	Total No. of Persons exposed.	Type of Cases.	Total attacked.	Attack-rate per cent.	Case-mortality per cent.	Total No. of Persons exposed.	Type of Cases.	Total attacked.	Attack-rate per cent.	Case-mortality per cent.
1 month and under -	5	- - - -	0	*0*	*0*	13	**C. D. C. C. C. C. C. C.**	8	*61·5*	*100·0*
1 to 3 months -	8	- - - -	0	*0*	*0*	6	C. - - - -	1	*16·6*	*0*
3 „ 12 „ -	52	- - - -	0	*0*	*0*	3	C. - - - -	1	*33·3*	*0*
1 „ 2 years - -	60	- - - -	0	*0*	*0*	2	**C.** - - -	1	*50·0*	*100·0*
2 „ 3 „ - -	72	- - - -	0	*0*	*0*	2	M. D. - - -	2	*100·0*	*0*
3 „ 4 „ - -	75	- - - -	0	*0*	*0*	2	**C.** - - - -	1	*50·0*	*100·0*
4 „ 5 „ -	60	M. M. M. - -	3	*5*	*0*	4	C. **C.** C. - -	3	*75·0*	*33·3*
5 „ 6 „ - -	47	M. M. - - -	2	*4·2*	*0*	8	C. D. C. D. D. -	5	*62·5*	*0*
6 „ „ - -	63	M. M. M. - -	3	*4·9*	*0*	3	D. - - - -	1	*33·3*	*0*
7 „ 8 „ - -	67	M. M. M. D. D. M. D.	7	*10·4*	*0*	1	C. - - - -	1	*100·0*	*0*
8 „ 9 „ -	55	D. M. M. M. D. **C.**	6	*10·9*	*16·6*	6	D. **C.** C. C. M. -	5	*83·3*	*20·0*
9 „ 10 „ - -	69	M. M. M. M. D. D. M. M. M. M. M. **C.***	12	*17·4*	*8·3*	5	C. C, C. - - -	3	*60·0*	
	633		33			57		32		

Explanatory note :—M = mild. D = discrete. C = confluent. The deaths are printed in block type.
* Vide footnote to Table XXXIV., p. 51, *ante*.

CHART *showing the Case Mortality (black) and the Case Severity* (blue) per 1000 persons living of the Unvaccinated and the Vaccinated in the different age periods among that portion of the population of Warrington living in the infected houses in 1892-1893.*

(Extracted from table XXXI.)



✳ *Vaccinated once only during their lives, including also those "Doubtfully Vaccinated."*

* *Proportion of Confluent cases to total cases at that age*

To face page 54 (i).

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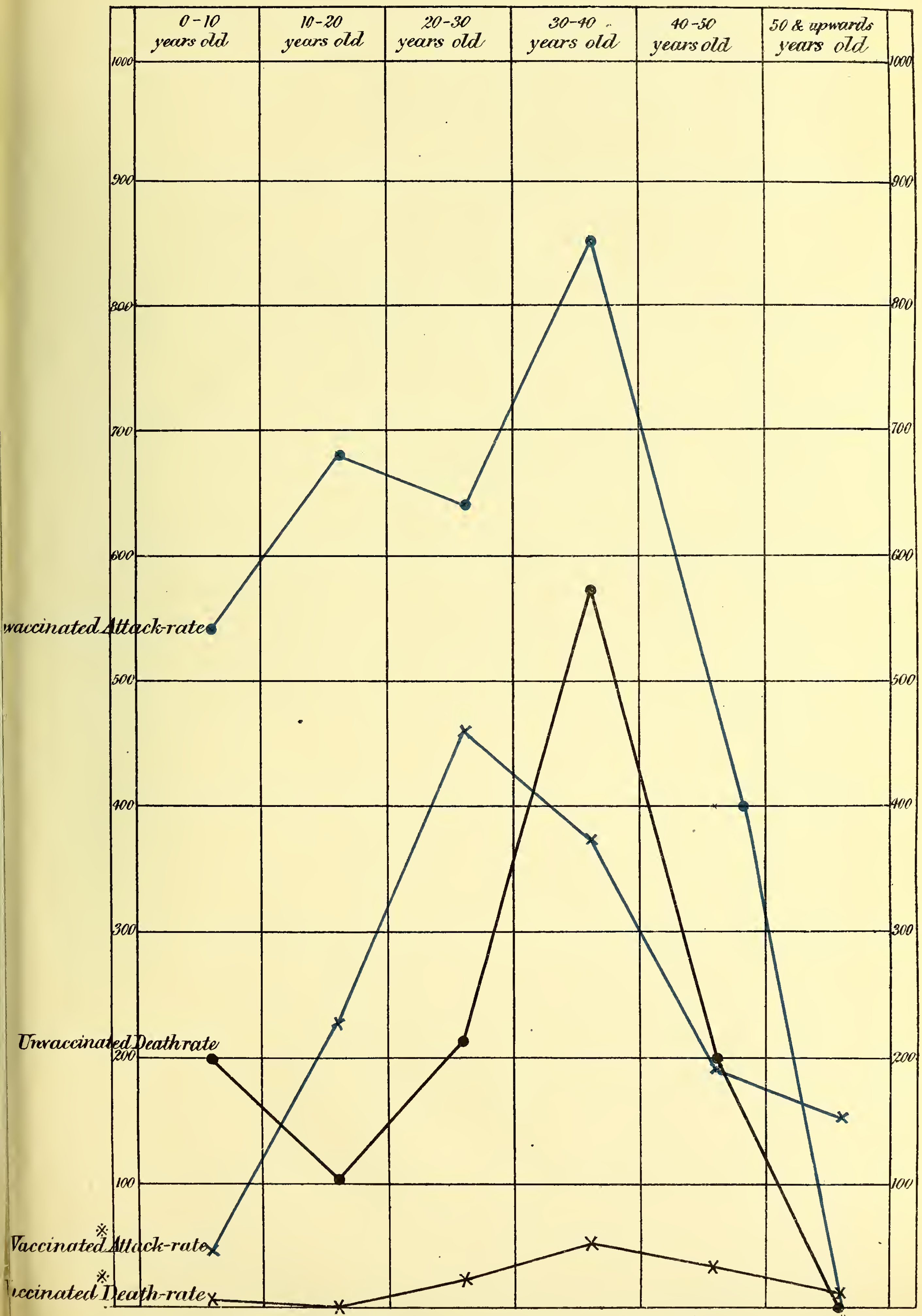
CHART *showing the Attack-rate (blue) and Death-rate (black) per 1000 persons living, of the Unvaccinated and the Vaccinated in the different age periods among that portion of the population of Warrington exposed to infection in the infected houses in 1892-1893.*

(Extracted from table XXXI.)



* *Vaccinated once only during their lives, including also those "Doubtfully Vaccinated."*

To face page 54 (ii).

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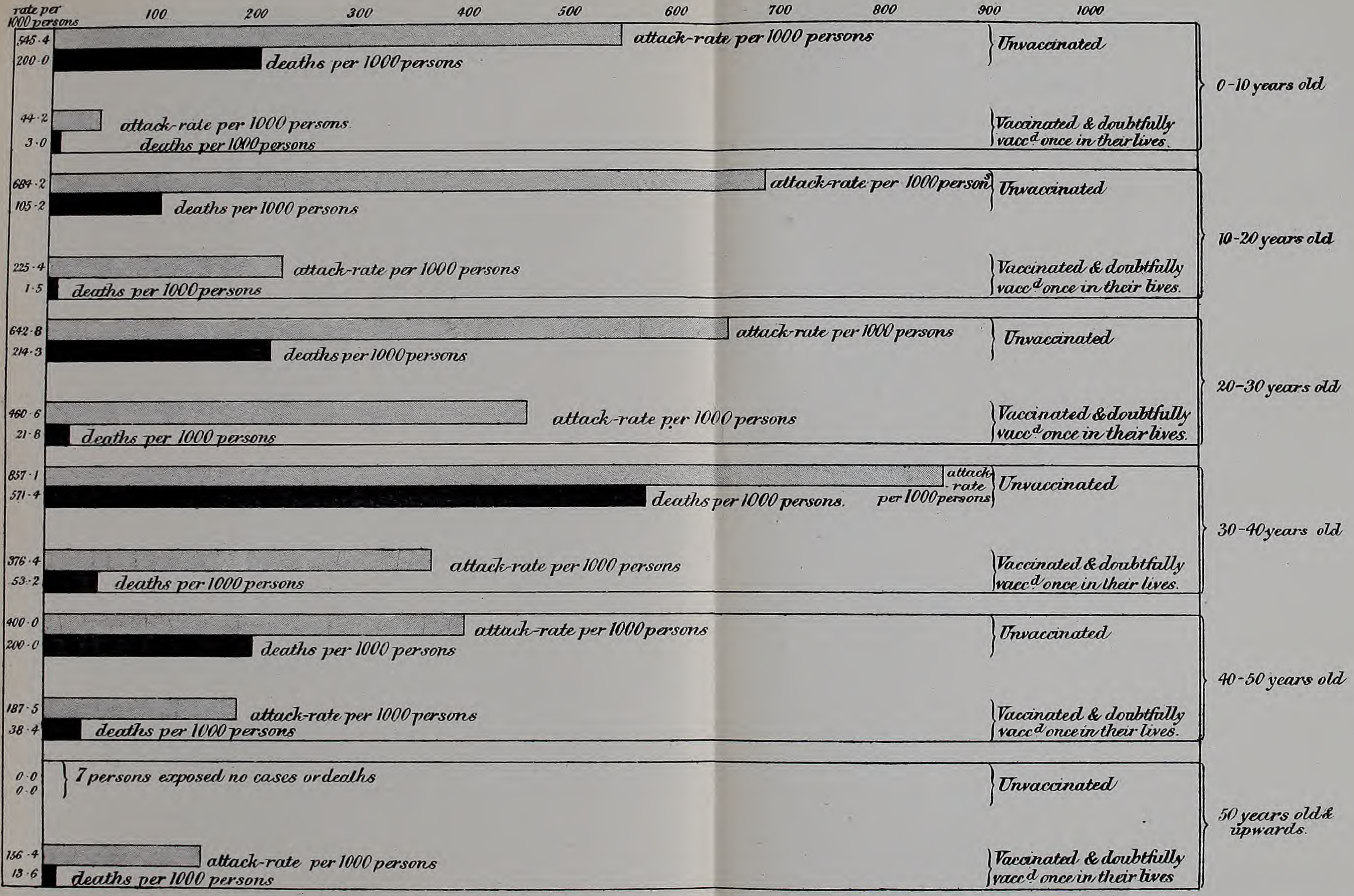
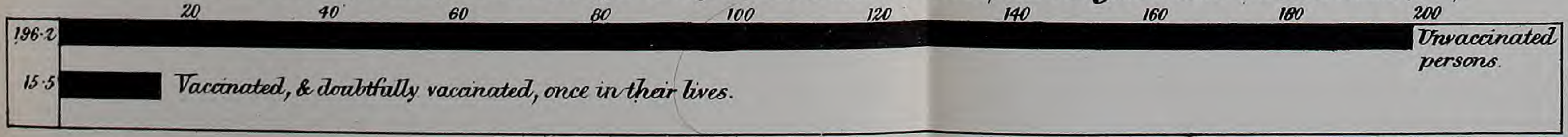
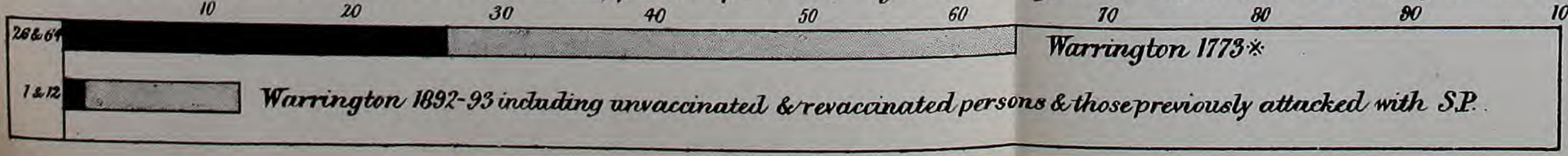
CHART showing the proportion of the Attack-rate and Death-rate per 1000 persons living, in different classes and age periods, among that portion of the population of Warrington living in the Infected houses in 1892-1893.
(derived from Table XXXI.)



Death-rate per 1000 persons of all ages living in the Infected houses, Warrington 1892-93 (vide table X p. 27.)



Death-rate (black.) & Attack-rate (shaded) per 100 persons living in Warrington in 1773 & 1892-93 respectively both in infected & uninfected houses.



To face page 54 (iii)

* The attack-rate in 1773 is M^r Aikin's estimate.

The salient points in this sub-section (*c*) are—

(1) That out of 633 vaccinated persons under 10 exposed in the infected houses 33 contracted the small-pox, all but two in a comparatively mild form, and only one died of that malady alone.

(2) That out of 55 unvaccinated persons under 10 exposed in the infected houses, 32 contracted the small-pox in a severe form, and 12 of them died of that malady alone.

Such a comparison might be objected to on the ground that the unvaccinated children died of small-pox more readily because of the ailing health which was also the reason of their non-vaccination. But my inquiries on this head led me to conclude that in the vast majority of instances, the cause of non-vaccination in these 55 unvaccinated children was, as already stated (p. 23), the passive negligence of their parents. The general health of all of these children, vaccinated and unvaccinated, appeared to be good, excepting the solitary instance of John M—— æt. 9 years and 2 months. Living side by side in the same houses, and under the same hygienic and social conditions, these groups seemed to me to be strictly comparable.

One is here reminded of the proportion of cases to deaths in Warrington in 1773, as estimated by Rev. J. Aikin (p. 36, *ante*). This observer tell us that in one neighbourhood out of 29 who had the disease 12 died. Now, as all the 211 cases who died in 1773 were under nine years of age it is very possible that most of the 29 persons attacked were under that age, an assumption rendered more reasonable as we know that persons at the later decades of life were probably protected by a previous attack of the disease in early life, from which they had happily survived. If so, the case-mortality among the unvaccinated in Warrington 1773 (41 per cent.) corresponded within little of the case-mortality among the unvaccinated in Warrington 1893 (37·5 per cent.).

—	Cases.	Deaths.	Fatality Per-centage.
Unvaccinated in Warrington, 1773.	29 (probably) under 9	12	*41·0*
Unvaccinated in Warrington, 1893.	32 cases under 10	12	*37·5*

Protection from small-pox would seem to be very complete in the early periods of life, for 272 persons under 4 were exposed to infection in the infected houses, yet none of them contracted the disease. About seven, eight, and nine years this protection seems to be commencing to wear off. But the *modifying* power still remains throughout the first decade of life, for here there were only two vaccinated confluent cases (who died) both after the age of 8, and one was in a child ill of another malady.

Subsequent Decades.

As regards the second and subsequent decades there are not sufficient unvaccinated cases to make a comparison profitable, but it would seem that in an average person the power of primary vaccination to *protect* against small-pox dies away in the third (20 to 30) decade of life (Table XXXII.), and the power of vaccination to *modify* small-pox diminishes in the fifth (40 to 50) decade (Table XXXIV.). Though even in the fifth decade it is not lost. There were 9 deaths out of 40 cases, or a fatality of 22·5 per cent. as compared with a fatality of 72 per cent. among unvaccinated cases at this time of life as given by Marson* from the 2,654 unvaccinated cases admitted into the London Fever Hospital, 1836–51.

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* Reynolds' System of Medicine, Vol. I., p. 239.

SECTION IX.—ON THE EVILS ALLEGED TO ARISE FROM VACCINATION.

Precise particulars of the vaccinated condition of 5,778 persons were inquired into by me or my medical assistants, and in three instances specific allegations were made against the practice of vaccination.

1. The sister of Case 120, a girl of 10, was stated by her mother (living in Glasshouse Row) to have been subject to "blotches" on and off ever since a month or two after vaccination at the age of six months, and to have had "a gathered navel" and "abscesses" since then. The child when I saw her (Jan. 19, 1893) had a typical syphilitic lepra on the body, and a discharge from the nose. The mother informed me that the child had "never "been well from birth." The other children were healthy, but their mother had had four miscarriages after the birth of this child.

2. Mary F———, at 21 (a discrete case of small-pox, No. 567), stated that she had had a breaking-out on the head ever since being vaccinated in infancy. I examined her head and found her to be suffering from dandriff, such as sometimes ensues from a neglected ring-worm of the scalp.

3. The case of Percy S———, who was certified as having died from "premature birth—vaccination" at the age of 17 days, was the subject of a separate Report * and is referred to also on p. 35, *ante*. After making a special inquiry into this case I came to the conclusion that "the "chief, and probably the only cause of death was asthenia "due to its premature birth, and that vaccination took "little or no part in the causation."

These were the only cases which came to light.

Revaccination.

Very few people were revaccinated prior to the epidemic, but during the panic it is estimated that 16,000 or 17,000 persons were done.

The father of case 281 stated he had lost seven weeks' work by his arm being bad after revaccination in November 1892. His doctor informed me that he had suffered from cellulitis.

I was informed that some 66 revaccinated employees at the Dallam and Bewsey Forge out of about 1,400 done, (five per cent.) were away from work on this account for four or more days. However, it is not well to attach too much importance to this because it is within my knowledge that many of them stay away from work, or as they appropriately term it "go on play," for very little.

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* March 15, 1893. *See* the Appendix to Report of the Royal Commission on Vaccination—(Alleged deaths from Vaccination).

SUMMARY.

The statistical facts and circumstances, mentioned in the foregoing pages with so much prolixity in order that they may be fully apparent, are the result of prolonged inquiry.

It is obvious from these that there were remarkable differences between the attack-rate, case-mortality, age at death, and death-rate of small-pox, as it occurred among unvaccinated persons in Warrington 1892–1893, and among vaccinated persons in Warrington 1892–1893; and, also between the disease as it occurred among the population of Warrington in 1773, and among those vaccinated persons who were attacked in 1892–93. (*See* three accompanying charts.)

It is also obvious that there are certain points of similarity between the disease as it arose amongst the population of Warrington in 1773, and amongst those persons who were unvaccinated in 1892–93.

After exhausting every possible source of information, I was unable to ascertain any adequate cause for these differences and points of similarity, excepting the circumstance that the several groups of persons were respectively vaccinated or unvaccinated.

PART III.

Special Preventive Measures—Recognition, Notification, Disinfection, Removal, Isolation, and Hospital Provision. The Question of Aërial Spread.

This part of the Report on the Warrington small-pox epidemic, 1892–3, will refer to those preventive measures which are specially applicable to infectious diseases, and particularly to a highly infectious malady like small-pox. The facts will be grouped under seven headings:—

		Page
I.	Recognition and notification - - - - - - - - - - -	56
II.	Removal of patient - - - - - - - - - - - -	59
III.	Disinfection of infected house and quarantine of friends and schools - - - - - -	60
IV.	Hospital provision. Description of the Old Borough Fever Hospital, Aikin Street - - -	61
V.	Position of the Old Borough Fever Hospital, the spread of small-pox around it - - -	64
VI.	The new or temporary hospital (Hope Hospital) in Dallam Lane: description and administration -	67
VII.	The question of spread of small-pox by aërial convection around the temporary hospital in Dallam Lane - - - - - - - - - - - - - -	69

SECTION I.—RECOGNITION AND NOTIFICATION.

Sub-section *a*.—Recognition of Small-pox.

It is, I believe, customary in the present day to epitomise the special means to be adopted for the prevention of small-pox in three words — vaccination. isolation, and disinfection. But it will be seen, by a perusal of the narrative of the outbreak (Part I.), what an extremely important part non-recognition of the malady played in the causation of this epidemic.

1. It will be seen on p. 8, *ante*, how three of the four cases forming the preliminary outbreak in May were imported into Warrington owing to the non-recognition by the doctor of the case which formed the source of their infection, in Clifton, near Brighouse, Yorkshire. There is no evidence as to the type of the non-recognised case; but he was said to have been sufficiently ill to be confined to bed for a few days. Fortunately these were only followed by one secondary infection.

2. It will also be seen, on p. 9, *ante*, that three out of the 15 cases forming the 2nd group of the larger epidemic commencing in August, were seen by a doctor's assistant, who failed to recognise the malady for ten days, seven days, and altogether, respectively. There is good evidence to show that two of these were well-marked types of the affection. The disastrous results of the non-recognition of these cases are sufficiently set forth in the narrative of the succeeding events.

Causes of non-recognition.

It is difficult, and in many instances impossible, to distinguish delay in recognition from delayed notification due to other causes. Taking both of these together there were, during the epidemic from May 1892 to May 1893, 112 cases where recognition or notification was delayed for two or more days after the appearance of the eruption.

Difficulty in diagnosis.

Small-pox in its classical form is one of the very easiest of diseases to recognise. Its sudden advent in a person in previous health, its marked symptoms, its typical eruption, are unmistakable; it may seem, therefore, a little remarkable that so many cases should have been overlooked.

Nevertheless the majority of the cases of delayed recognition were of a mild type. Out of the 667 cases observed 329 have been classed as mild (modified or varioloid); and this type of case, which seems to predominate in the present day, undoubtedly may present very great difficulties in diagnosis from such diseases as measles, varicella, acne, and what the people call "heat bumps" or "pimples."

One case developed only three or four "pimples" on his face, attended with so little constitutional disturbance that it never occurred to him to cease work. Yet the case was undoubtedly one of small-pox and other cases subsequently arose in the house.

Neglect of friends.

In the early stage of the epidemic, the patients and their friends, owing to their ignorance and neglect of any but a marked illness, sometimes failed to send for a doctor until the disease was advanced. This rarely happened in severe cases, generally the cases were mild (6, 8, and 30*a*, p. 10). But even in the mild variety the pain in the back preceding the eruption, usually made them seek medical aid. This symptom, in my experience, was rarely or never absent even in the mildest cases.

At a later period of the outbreak especially when medical aid was difficult to procure, the people frequently recognised and notified the condition themselves.

Diseases mistaken for Vario

As regards the other diseases mistaken for variola, nine persons were taken into the Small-pox Hospital suffering from other diseases erroneously diagnosed as small-pox:—

5 cases of varicella,
2 cases of scarlatina,
1 case of acne, and
1 case of "erythema" (or ? measles).

Only one of these, the last-named, contracted small-pox (Case 574*a*.) from the procedure. They had all been re-vaccinated either shortly before or on admission. The man who thus contracted small-pox (Case 574*a*), æt. 35, was admitted with erythema or (?) measles on March 15th; was re-vaccinated by the Assistant Medical Officer of Health twice, on 17th and 19th of March, both times unsuccessfully, and developed the eruption of small-pox on April 1st—17 days after his first admission and 15 and 13 days respectively after the dates of his unsuccessful re-vaccinations.

Sub-section *b*.—Notification.

Notification has been in force in the borough of Warrington since the passing of a special Act, "The "Warrington Corporation Lighting and Improvement "Act, 1879." Sections 23, 24, and 25 of that Act impose the responsibility of notifying infectious disease on both the doctor and the householder. When the epidemic was at its height many cases were notified without waiting for a doctor, but in most cases the duty devolved on the medical attendant.

Procedure.

Notices of infectious disease are directed to be "sent by post or otherwise" addressed to the Medical Officer of Health at his office at the Town Hall.

Upon receipt of such notice, the Medical Officer of Health, after visiting the case, gives directions for an ambulance to be sent to fetch the patient. The Medical Officer of Health does not reside at the Town Hall, and it is possible that slight delay may have arisen in this way.

Unnotified Cases.

Out of a total of 667 cases, 16 were never notified, either by the doctor or by the patient's friends, but were discovered subsequently by other means. Such cases have been indicated by the letter *a* after the number. Thus 97·6 per cent. of the persons known to have suffered from small-pox were notified to the authorities. This is a higher proportion than is usual in severe epidemics. Table XL. at foot gives particulars of the unnotified cases.

The majority of the unnotified cases occurred in the early part of the epidemic, 8 of them in the first three months.

Twelve of the 16 unnotified cases were of the mild, modified, or varioloid type, and seven of these were of a very mild and trivial kind.

Three others were discrete. Only one case was confluent, a baby, born on the day its mother developed the eruption, who was admitted with its mother to hospital and was vaccinated four days later, developed the eruption four days afterwards, and finally died five days later.

Causes of Non-notification.

As regards the causes of their being unnotified, five persons did not feel sufficiently ill to induce them or their friends to seek medical advice at all. Four other cases were supposed by their medical attendant to be chicken-pox, and the mistake was only subsequently discovered, generally after small-pox had occurred in others with whom they were associated. One case was not recognised by the doctor's assistant; three were already in hospital; and in three the reason of non-notification was undiscoverable.

TABLE XL.

Giving Particulars of the 16 Unnotified Cases.

No. of Case.	Book and Page.	Name and Age, and Residence where Rash appeared.	Date of Rash.	Type of Case.	Reason of Non-notification.
6*a*.	V. / 2	H——, Haywood, 31 -	17 / VIII.	Very mild - -	Not recognised by doctor's assistant.
30*a*.	VII. / 11.	M——, Agnes, 21 -	20 / VIII.	Very mild - -	Not ill enough to consult a doctor.
55*a*.	IV. / 23	J——, Ada, 9 - -	12 / IX.	Mild - -	Supposed varicella in Fever Hospital at the time.
60*a*.	IV. / 24	O'D——, Jimmy, 10 -	12 / IX.	Very mild - -	Ditto ditto ditto.
69*a*.	I. / 2	B——, Alice, 14 - -	21 / IX.	Very mild - -	Not ill enough to consult a doctor.
148*a*.	I. / 2	B——, Charlotte, 20 -	8 / X.	Very mild - -	Ditto. ditto.
	IV. / 1	C——, Elizabeth, 13 -	26 / X.	Discrete, deeply pitted	Already in Fever Hospital.
239*a*.	XV. / 20	S——, Charles, 10 -	30 / X.	Very mild - -	Not ill enough to consult a doctor.
302*a*.	IV. / 2	M——, Annie, 7 -	9 / XI.	Discrete - -	Already in Fever Hospital.
376*a*.	II. / 16	L——, Jos., 8 - -	? Sept.	Mild - -	Supposed varicella.
377*a*.	II. / 13	L——, John Jas., 4 -	? Sept.	Mild - -	Supposed varicella.
416*a*.	XI. / 24	R——, Richard, 17 -	29 / XI.	Very mild - -	Unknown.
442*a*.	XV. / 25	H——, Annie, 30 -	3 / XII.	Mild - -	Unknown.
461*a*.	XI. / 13	E——, Mary, 13 days -	16 / XII.	Confluent - -	Born, developed eruption, and died in Small-pox Hospital.
574*a*.	XIV. / 33	B——, James, 35 -	15 / III.	Discrete - -	Unknown.
639*a*.	XVIII. / 10	H——, William, 25 -	12 / IV.	Mild - -	Not ill enough to see a doctor.

Delayed Notification.

There were in the epidemic, besides the instances which were never notified at all, 87 other cases where notification was for some reason delayed for varying periods of time from two to six days after the eruption had appeared.

The cause of this delay in many instances was that the friends did not at first realise the necessity of seeking medical advice; but quite an equal number were due to a failure on the part of the doctor to promptly recognise the complaint, or, recognising it, to promptly send notice.

It is not possible to give a statistical statement of the ratio of these two causes, but the above may be taken as approximately correct. In certain instances both causes were in operation.

An undue proportion of these 87 infected houses contained second cases. But the number is too small to examine whether the delay modified the course of the disease.*

Concealed Cases.

Case 260, which is not included in the above list, was not notified till after death, for it was concealed by the parents. It was an unvaccinated child, Sarah M———, æt. 8, who developed the eruption of what seemed to have been confluent small-pox about October 20th, and died at home on November 3rd. At a coroner's inquest, held on November 5th, the verdict brought in was, "Death by small-pox, accelerated by neglect of the mother."

At the time of my visit to this house, on a Sunday morning, both parents were intoxicated.

There was only one other prosecution for concealment by a householder undertaken during the epidemic. In the month of March action was taken against a lodging-house keeper for sending away his son (Case 523) to Ireland without notification. The result was conviction and fine.

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* There was a fact in reference to scarlet fever, showing the effects of compulsory notification, which was incidentally revealed, and which is mentioned in Part I., p. 7, *ante*.

SECTION II.—REMOVAL OF PATIENT.

SUB-SECTION *a*.—METHOD OF REMOVAL.

Ambulances were provided at the time of my visit on December 1st, at both the Old Hospital (Aikin Street), which then contained only scarlet fever cases, and the New (Temporary) Hospital which received only small-pox cases, for the transference of these diseases respectively. But at an earlier date the one ambulance kept at the Old Fever Hospital was made to serve for both diseases, scarlet fever and small-pox. The footnote (†) to the table on p. 12, *ante*, may be referred to in this connection. In that instance a child suffering from scarlet fever developed the rash of small-pox 13 days after removal to the Old Fever Hospital, in the same ambulance as a small-pox patient had, it was alleged, been taken just before.

Up to the latter part of November one man, the caretaker at the hospital, did the whole of the removals for all classes of infectious diseases, and with the same ambulance. The same person did the house and furniture disinfection in the town, and superintended the disinfection of bed and bedding, which was all done at Aikin Street. He is previously referred to on p. 11. A horse and driver were hired for each occasion from a cab proprietor in the town.

After the latter part of November an additional ambulance was kept at the New Hospital, and a nurse sent out with it. A horse and man still being hired from stables in the town.

Owing to the habits and mode of life of the people among whom the disease occurred, it was not possible to look for anything approaching isolation in the patient's own home. The question, therefore resolved itself into one of removal to hospital.

SUB-SECTION *b*.—DELAYED REMOVAL.

Out of the 667 cases, 133 (20 per cent.) were delayed in their removal to hospital for two or more days after the appearance of the eruption, and some of these were never removed at all.

Causes of delayed Removal.

It is evident that delay in the isolation of a case may arise from three causes:—1. Non-recognition of the disease either by friends or doctor. 2. Delay in notification on the part either of friends or doctor. 3. Delay in removal after notification either by obstruction of friends, inaction of authorities, or the absence of hospital accommodation. The first two causes have already been dealt with, and it remains now to examine the third, eliminated as far as possible from the other two.

As far as my information goes, the instances of the delay in isolation were distributed as follows:—

1.—Owing to deficient hospital accommodation, there were 91 cases left at home, either altogether or for periods varying from 2 to 22 days, after the rash had appeared and the case was notified.

The limit of accommodation for small-pox in the *old fever hospital* was reached on August 23rd, and between this date and the opening of the new temporary hospital, on September 19th, 46 cases lacked prompt removal in the above sense.

On November 12th the limit of hospital accommodation was for a second time reached, in spite of the conversion of the disused ironworks into a *temporary hospital*. From this date, during November and part of December, 45 cases were left at home for varying periods owing to this cause.

Delays in recognition and notification are for the most part not included in the above 91 cases, which form, it will be seen, nearly three-fourths of the 133 instances of delayed removal.

2.—Ten persons admitted that they had refused to be removed.

3.—Various causes accounted for the remaining 32, such as the patient being too ill for removal, delayed action by the friends, some accidental cause, or reasons undiscoverable.

Effects of delayed Recognition, Notification, and Removal.

The effects of delay in removal might be measured in three ways:—

1. By comparing the number of second cases which arose in the infected houses, where delay occurred, with those in which removal was prompt.
2. By comparing the attack rate in these two groups of houses.
3. By comparing the case-severity and death-rate in these two groups of houses.

The first two would show the influence of delay on the spread of small-pox, and the last the influence on severity of the disease.

But it is obvious that these results would be considerably modified by the length of delay, *i.e.*, the duration of exposure, overcrowding, age of patient, and many other sources of fallacy; and as the figures are not large enough to admit of an analysis which would eliminate these sources of error, it is undesirable to attempt in detail thus to measure the effects of the delay.

SECTION III.—DISINFECTION OF INFECTED HOUSE AND QUARANTINE OF RELATIVES.

SUB-SECTION *a*.—DISINFECTION OF HOUSE.

After removal of the case, the house and furniture were subjected to disinfection with more or less promptitude and more or less efficiency.

The house disinfections were carried out by the caretaker at the Aikin Street Hospital, or under his supervision. I had several opportunities of witnessing the performance.

During the process of burning sulphur ("stoving," as the people called it) the inmates were of necessity turned out of the house, when, as is usual, the house was small.

The mother of Case 144 affirmed that she had—"seen people in this street when disinfection was being "done in their houses take their furniture to neigh-"bours' houses, so that it should not be affected by it."

The bedding and infected articles were conveyed to the disinfector at Aikin Street Hospital, where a new Lyon's steam disinfector was erected, and used on December 1st, 1892. Before that date hot air alone was employed, and as the time required for this is considerable and the pressure of work great, the result was not always satisfactory.

Delayed Disinfection.

Altogether 52 instances of alleged delay or error in disinfection came under notice, of which the following are illustrations:—

The bed of Case 185 was not taken till three weeks after removal. The father of the case developed the disease in the same house 19 days after his daughter.

Case 110 occurred in a house which was not disinfected for two weeks; 16 or 17 days after the first, two other cases arose.

The house of Case 180 was not disinfected at all. Between two and three weeks later another (fatal) case occurred in the same house.

The house where Case 81 occurred was not disinfected for 14 days after removal. The house was rather overcrowded (nine inmates), and four other cases arose therein within the three weeks succeeding the removal of the first.

These were some of the instances which occurred during September and early October, when the outbreak was of moderate dimensions.

Later on, when the resources of the borough were taxed so severely, it would be only natural that delay and defect should occasionally occur. Nevertheless, the majority of the 52 instances of delayed or faulty disinfection seem to have occurred in September and October. The following table shows the chronological distribution of these instances:—

1	in	August	1892,	when	20	cases arose.
16	,,	September	,,	,,	104	,,
13	,,	October	,,	,,	134	,,
11	,,	November	,,	,,	184	,,
5	,,	December	,,	,,	56	,,
3	,,	January	1893	,,	40	,,
1	,,	February	,,	,,	28	,,
1	,,	March	,,	,,	42	,,
1	,,	April	,,	,,	46	,,

SUB-SECTION *b*.—QUARANTINE OF FRIENDS.

In the preliminary outbreak of four cases in May (Part I., p. 8), quarantine was very thoroughly carried out, for, owing to the isolated position of the house, and the good sense and the friendlessness of these newly-arrived people, isolation of the whole family before removal was a natural consequence. Subsequently, the only person in the household who escaped—the mother—voluntarily went into hospital with her husband and two children. *It may fairly be taken that this was one of the reasons why this preliminary outbreak spread no further.* One of the two men employed in the disinfection was the only case secondary to these.

With this exception, no measures for the actual removal and isolation of the healthy members of an infected household were adopted during the Warrington epidemic.

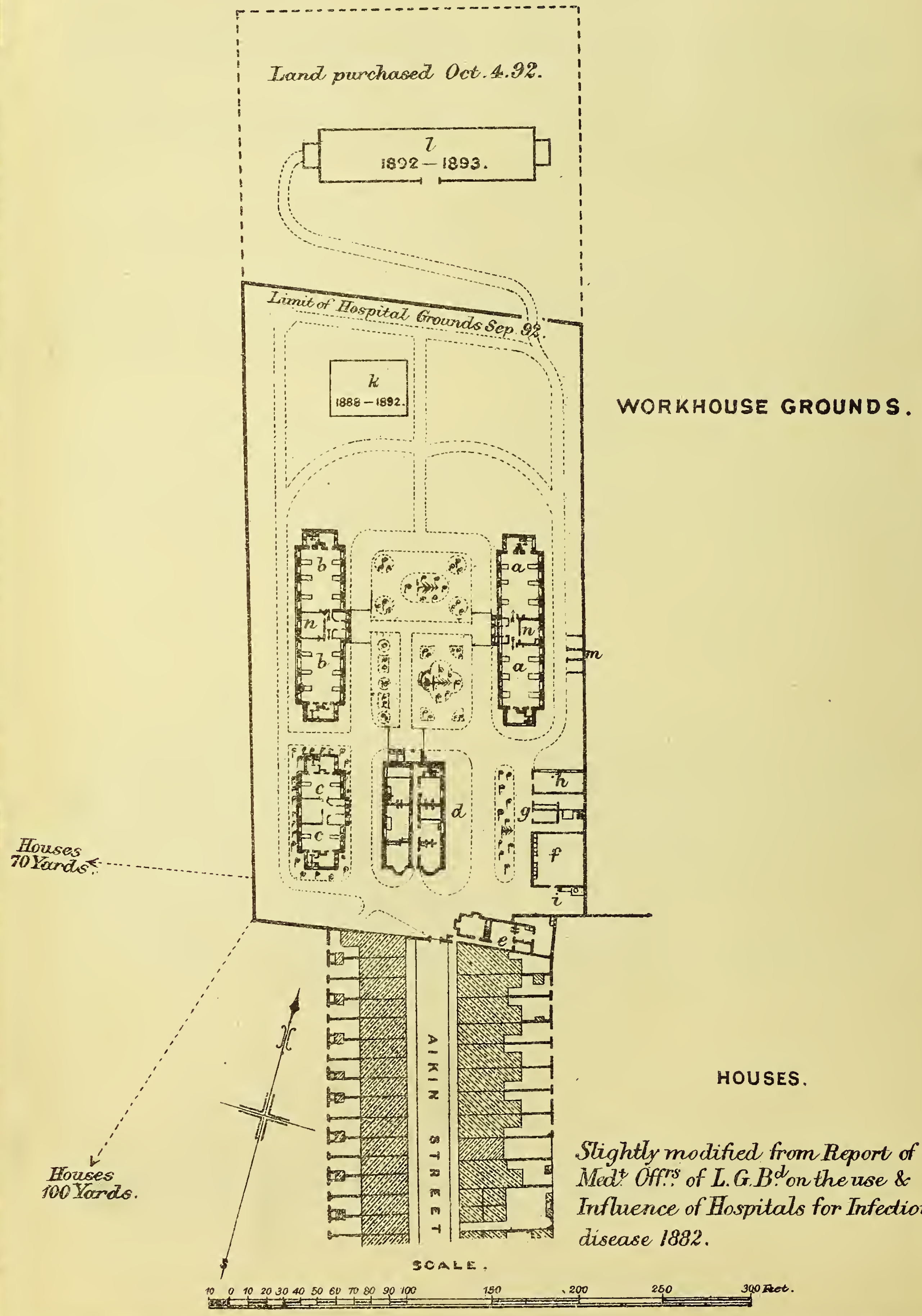
Nevertheless, the people were enjoined both to keep away from the patient, and not to mix with other folk. It is extremely doubtful if even a small proportion obeyed these injunctions. I was informed by the medical officer of health of one instance where a woman collected her friends to take a farewell cup of tea prior to her removal to the hospital with small-pox; and another instance where children were fetched home from school to bid their father good-bye prior to his removal to the small-pox hospital.

After October notices were sent from the Health Office to the employers of the rest of the family, and to the schools where the children went, after the removal of the case, and in many instances the workpeople stayed away one or two weeks.

SUB-SECTION *c*.—SCHOOLS.

It was not thought desirable to close the schools at any time during the epidemic, and, as may be seen in Part II. (p. 49), the children among the vaccinated persons were themselves freer from attack than any other age period under 40; though it would seem probable that their playing on the open spaces, especially about the hospitals, was a fruitful source of mediate contagion.

BOROUGH OF WARRINGTON
INFECTIOUS DISEASES HOSPITAL.
AS ERECTED IN 1877 AND ADDED TO IN 1888 AND 1892.


Land purchased Oct. 4. 92.
l
1892 — 1893.
Limit of Hospital Grounds Sep. 92.
k
1888 – 1892.
WORKHOUSE GROUNDS.
a
n
a
b
n
b
m
c
c
d
h
g
f
i
e
Houses 70 Yards
Houses 100 Yards.
AIKIN STREET
HOUSES.
SCALE.
10 0 10 20 30 40 50 60 70 80 90 100 150 200 250 300 Feet.

Slightly modified from Report of Medl. Offrs. of L. G. Bd. on the use & Influence of Hospitals for Infectious disease 1882.

Wyman & Sons, Ltd. Lith. 5748.2.94.

SECTION IV.—HOSPITAL PROVISION; OLD BOROUGH FEVER HOSPITAL (AIKIN STREET).

Sub-section *a.*—History and Description of Hospital.

The hospital for infectious diseases for the borough of Warrington was opened in May 1877, and a full description of it, by Dr. Thorne Thorne, as it existed in 1881, will be found in the Report of the Medical Officer to the Local Government Board, on "The Use and Influence of Hospitals for Infectious Disease," published in 1882 (p. 272).

The site is an irregular oblong, covering nearly two acres in extent, situated at the northern (blind) end of Aikin Street, which forms its only means of approach, in what is rather a thickly-populated part of the town. The accommodation in 1882 was 28 beds, with an average cubic space per bed of 2,040 cubic feet.

1888.

In 1888 a Doëcker hut (*k*) was erected on the northern end of this ground, to contain two beds.

1890.

On August 14th, 1890, the Warrington Extension and Water Act, 53 & 54 Vict., received the Royal Assent. Section 84 runs as follows :—

> "(1.) For the purpose of enlarging their existing hospital for infectious diseases or of otherwise providing increased accommodation for persons suffering from any infectious disease, the Corporation may enter on take and use such of the lands delineated on the deposited plan and described in the deposited book of reference, as they may require for that purpose.
>
> "(2.) The power of taking land under the provisions of this section shall not be exercised after the expiration of two years from the passing of this Act."

At this date and afterwards the Medical Officer of Health frequently urged the desirability of better provision for infectious disease, but the purchase of additional ground was not completed till October 4th, 1892, at a time when the small-pox epidemic had a complete hold on the town, and the building (*l*) was not erected till the latter part of that month.

Thus, in May 1892, when the small-pox epidemic commenced, the actual provision for the isolation of of infectious disease arising within the borough, comprising a population of 54,084 consisted of 30 beds.

On September 19th, 1892, the disused ironworks were openedas a temporary hospital (p. 64). The various other steps taken by the authorities when in presence of the epidemic of small-pox are set forth in the narrative of the epidemic, pp. 8 to 17, *ante.*

1892.

On August 26th, 1892, the Doëcker hut (*k*) was accidentally burnt down.

1893.

The new pavilion (*l*) was accidentally burnt down seven months after its erection, May 1893.

Receiving Ward.

Herewith is submitted a plan of the Warrington Infectious Disease Hospital as erected in 1877, and added to in 1888 and 1892, with explanation.

The structure and arrangement of the old buildings are good. They are fully described in Dr. Thorne Thorne's report (*op. cit.*). The new pavilion on the piece of ground at the northern end was built of wood, sawdust lined. Otherwise its arrangements were the same as the existing pavilions.

It will be observed that receiving ward accommodation—where a patient can be received and quarantined pending the arrival of the doctor, and pending his decision as to the nature of the disease, and where patients and visitors can be disinfected prior to discharge—has never been provided.

Two cases of small-pox (65 and 75) were notified by practitioners as scarlet fever, and therefore taken direct into the scarlet fever ward, until it was discovered that they were suffering from small-pox.

It has been mentioned (p. 56, *ante*) that instances of other diseases were brought to the small-pox hospital by mistake, and that one of these contracted the malady.

The accompanying Table XLI. shows the provision in different years for the isolation of all kinds of infectious disease in Warrington from 1886, when the fever hospital was opened, to 1892.

TABLE XLI.

Showing the Provision for the Isolation of Infectious Diseases of all kinds in Warrington, from 1886 to 1892.

Year ending Mid-summer.	Population.	Number of Beds for Infectious Diseases.	Average Cubic Space per Bed in Cubic Feet.	Proportion of Beds to Inhabitants.
1886 -	46,343	28	2,200	1 to 1,655
1887 -	47,264	28	2,200	1 to 1,688
1888 -	47,464	30	2 200	1 to 1,582
1889 -	49,000	30	2,200	1 to 1,633
1890 -	50,000	30	2,200	1 to 1,666
1891 -	53,000	30	2,200	1 to 1,758
1892 -	54,084	30	2,200	1 to 1,800

Borough of Warrington Infectious Diseases Hospital.

a. a.—Two wards, each measuring 36′ by 24′ by u4′, each for six beds. Commonly used for acute scarlet fever cases. Cubic space, 2,016 cubic feet per bed.

b. b.—Two wards, each measuring the same as *a. a.* Each for six beds. Commonly used for convalescent scarlet fever patients.

c. c.—Two special wards, used for typhoid or small-pox cases. Two beds each. Each ward giving 2,529 cubic feet per bed.

d.—Administrative building, where nurses and matron reside. Also contains laboratory of Medical Officer of Health, who is Public Analyst.

e.—Entrance lodge, where the hospital keeper resides.

f.—Laundry.

g.—Disinfecting stove; Ransom's patent till Dec. 1892, when it was replaced by a Lyon's steam disinfector.

h.—Mortuary.

i.—Van shed.

k.—Doëcker hut erected in 1888, burnt down August 26th, 1892 ; measuring 24′ by 15′ by 10′ (3,600 cubic feet). Two beds.

m.—Tool shed.

n.—Nurses' day or duty rooms.

The original ground, on which all the above stand, is nearly two acres in extent.

l.—New pavilion, erected October 1892, having same measurements as pavilions *a. a.* and *b. b.* 12 beds. It stands on a piece of ground nearly one acre in extent, purchased October 4th, 1892. This building was burned down in May 1893.

SUB-SECTION *b*.—STAFF AND ADMINISTRATION (AIKIN STREET HOSPITAL).

Staff and Administration.

The general and medical administration of the hospital is in the hands of the Medical Officer of Health, who visits the hospital for this purpose. He is, in this capacity, immediately responsible to the Health Committee of the Town Council.

The chief resident official is the matron. The present holder of the post, had not, I was informed, had any previous training or nursing experience, prior to her appointment to the hospital in 1887. The same information also applies to the nursing staff (p. 12).

Nurses were engaged as occasion arose. On the day of my visit there were three on duty. An extra nurse was employed to attend the patients in the Doëcker hut before it was burnt down, and she resided there then.

The only male resident is the caretaker, who also superintends the disinfection of clothes, and the fetching of patients in the ambulance.

After the escape of R —— (Case 1) on July 30, a man (Case C.) was temporarily employed as night attendant.

I made inquiries into the movements of the staff, but was not convinced of the impossibility of infection by these means. After the opening of the new hospital (September 19) until the middle or end of November no sleeping accommodation could be provided in the later, so the assistant medical officer and the rest of the staff slept at the old hospital and went backwards and forwards daily to the new hospital, mostly, I was informed, in a cab.

It was said to be the practice to re-vaccinate officials on their appointment, but the two who contracted small-pox (p. 12) had not been re-vaccinated.

Nor were the scarlet fever patients re-vaccinated on the outbreak of small-pox amongst them. There were amongst these latter three unvaccinated persons who contracted small-pox:—

> Case 227*a*, æt. 13, Case 391, æt. 3, and Case 390, æt. 3, who left the scarlet fever hospital on Nov. 7, and developed the eruption of small-pox on 20th.

A description of the spread of small-pox among the patients and staff of the Aikin Street hospital is given fully on pp. 11 and 12 *ante*, and is briefly referred to below.

Removals and Disinfection.

Removals for all kinds of infectious disease were conducted from the ambulance station at the Aiken Street Hospital, and all the clothes and bedding were taken for disinfection to this hospital, throughout the epidemic. Until November, all cases of all kinds of infectious disease were removed in the one ambulance kept at Aikin Street.

Visitors.

According to the evidence of the visitors, they were not *at first* submitted to much regulation, and were allowed ingress and egress without changing of clothes, or putting on overalls. Valuable information as to the date of appearance of the small-pox rash in Case 302*a* was afforded by the mother of that patient, who visited her child in the hospital. Case 391 was another instance of the same kind.

SUB-SECTION *c*.—SCARLET FEVER EPIDEMIC, 1892.

Scarlet fever is endemic in Warrington. A table of the annual notifications of this disease will be seen on p. 63.

December 1892.

At the time of my visit to the Aikin Street Hospital on December 1, 1892, there were four structures planned to accommodate 40 patients, pavilion *a a* (plan, p. 161, *ante*) arranged for 12 beds, *b b* for 12 beds, *l* for 12 beds, and *c* for four beds.

In the first three pavilions I found an aggregate of 99 beds erected, and occupied by this number of scarlet fever patients, 51 adults and 48 children. This reduced the cubic space to about 720 cubic feet per bed. In the smaller building *c* there were three or four convalescents from small-pox. All the other small-pox patients had been sent to the temporary small-pox hospital on September 19th, but these were cases that had arisen among the scarlet fever patients.

The Medical Officer of Health has supplied me with the number of scarlet fever patients admitted to hospital in the respective months during the year 1892:—January, 12; February, 10; March, 11; April, 25; May, 38; June, 51; July, 50; August, 48; September, 58; October, 57; November, 28; December, 13; total for the year, 401.

The Medical Officer of Health also informed me that the average number in at any one time was between 70 and 80.

SUB-SECTION *d*.—SMALL-POX CASES ADMITTED TO AIKIN STREET HOSPITAL.

Provision was made in the Doëcker tent (*k*) until it was burnt down on August 26, 1892, and in the special pavilion (*c*) for a maximum number of 13 small-pox cases at one time. Small-pox cases were admitted to Aikin Street Hospital up to August 23rd. Those which arose after that date were left in their own homes, with a few exceptions, until September 19th. On this day the new temporary hospital was opened and the cases from the old hospital transferred to it; only those which had arisen in the old hospital among the scarlet fever patients being left there. Table XLIII., p. 64, shows the number of cases of small-pox admitted, discharged, and remaining in hospital each week, from particulars kindly supplied by the Medical Officer of Health.

SUB-SECTION *e*.—SPREAD OF SMALL-POX WITHIN THE AIKIN STREET HOSPITAL AMONG THE SCARLET FEVER PATIENTS AND THE STAFF.

In Part I. the incidents connected with the spread of small-pox among the scarlet fever patients and staff are mentioned (pp. 11 and 12), and a table of cases given.

The attack-rate among them was 4·7 per cent. (excluding two doubtful infections) out of 232 persons, as compared with 1·2 in the rest of the town as a whole, and ·8 among the inmates of the workhouse next door, albeit the hospital contained so large a number of the best protected decade of life among the vaccinated. The densely overcrowded state of the hospital—doubtless unavoidable *at the time* but nevertheless dangerous—is sufficient to account for this.

The first to contract the disease was the kitchen-maid, who fetched and washed the plates used by the first small-pox patient, case 1. At the same time a little scarlet fever patient also developed it. Unfortunately this latter was moved, doubtless owing to want of accommodation, over to the nurse's duty room in the middle of the other pavilion (*b b*), in which building the nurse, and six of her scarlet fever patients developed the small-pox in succession.

SUB-SECTION *f*.—MEASURE OF HOSPITAL REQUIREMENTS.

As a consequence of the long-delayed action of the Town Council to provide adequate hospital accommodation for the isolation of infectious diseases (pp. 8, 9 *et seq.*, and pp. 16, 17, and 61) the actual state of matters on November 10, 1892, was as follows. There were on this day 80 cases of scarlet fever and 156 cases of small-pox to be dealt with, making a total of 236 cases of highly infectious disorders, to isolate in a hospital certified to contain 30 beds. It is quite certain that if adequate hospital provision for the isolation of infectious diseases been made these figures would never have been reached, and the expenses and other consequences of the small-pox epidemic would have been almost entirely avoided.

In order to arrive at the requirements of Hospital accommodation for the isolation of infectious disease, it is necessary to know—

(1) the average annual number of cases of the several diseases requiring isolation, and

(2) the average length of stay in hospital of each disease respectively.

Information about the first can be obtained from Table XLII. (below); and the Clerk to the Asylums Board of London has kindly supplied me with the average length of stay in the hospitals of that Board of patients suffering from the four chief infectious disorders as follows—

Small-pox cases - - -	5 weeks
Scarlet fever - - -	10 weeks
Diphtheria - - - -	6 weeks
Enteric fever - - -	9 weeks

These figures relate only to cases treated in the hospitals to recovery.

There are three infectious diseases which seem to be constantly present in the borough of Warrington and which certainly require isolation, scarlet fever, diphtheria, and enteric fever; and it will be seen from Table XLII. that the average number of cases notified per annum of each of these disorders for the four years 1889–92, was respectively 241, 18, and 36. The hospital requirements for these three diseases may therefore be estimated as follows—

$$\text{Scarlet fever}\quad 241 \div \frac{52 \text{ weeks}}{10 \text{ weeks}} = 46 \text{ beds}$$

$$\text{Diphtheria}\quad 18 \div \frac{52 \text{ weeks}}{6 \text{ weeks}} = 2 \text{ beds}$$

$$\text{Enteric fever}\quad 36 \div \frac{52 \text{ weeks}}{9 \text{ weeks}} = 6 \text{ beds}$$

$$\text{Total for three diseases} \quad - \quad 54 \text{ beds}$$

In view of the social class amongst whom these disorders arise in Warrington (see p. 81 *et seq.*) it is fair to presume that all these cases notified ought to be isolated, and it seems also fair to assume that the average period of stay in hospital should correspond with that based upon the experience of the Hospitals of the Metropolitan Asylums Board of London.

It should, moreover, be remarked that the estimate of 54 beds as the isolation needs of the Borough of Warrington only provides for the *three* principal infectious disorders constantly prevalent in the town, and takes no account of measles, which is also constantly present and occasionally taken into the Borough Fever Hospital, and which caused an average in six years of 59 deaths per annum; nor does it provide for typhus fever, or small-pox, some provision for which diseases is undoubtedly necessary.

Nor does this estimate of 54 beds take into account the important factor of seasonal incidence, nor epidemic prevalence, of these *three* diseases. It does not allow for cases or outbreaks of small-pox or other infectious disease, nor for the future growth (*see* p. 84) of the town.

In order, therefore, *to cover the actual current needs of the Borough to provide for infectious diseases needing isolation—allowing only* 10 *beds for measles, small-pox, and typhus—at least* 64 *beds are absolutely necessary*. Thus:—

Scarlet fever - - -	46 beds
Diphtheria - - - -	2 beds
Enteric fever - - -	6 beds
Measles, small-pox, and typhus - - -	10 beds
Total - -	64 beds

Whereas the hospital provision at the present time (1893) *is barely half this number, or* 28 *beds.**—It is therefore not to be wondered at that the cases of small-pox, as they arose, were unable to be isolated, and that on this account the small-pox epidemic of 1892–93 reached the alarming proportions which it did.

It is customary to reckon in the abstract that 1 bed per 1,000 population is required for isolation purposes, and even by this method Warrington would require 54 beds, or nearly twice the number at present provided.—But as compulsory notification has been so long in force at Warrington one is able to gauge with unusual accuracy the actual requirements of the borough, and the result of this calculation shows that 64 beds is the irreducible minimum of such actual requirements at the present time (1893), without allowing for future growth of the population, which would be at the rate of seven additional beds for the next five years.

Finally, if it were proposed to accommodate, by courtesy or arrangement, the neighbouring Rural Sanitary District a larger provision than this would be requisite.

TABLE XLII.

NOTIFICATION TABLE showing details of the several CASES NOTIFIED (or DEATHS) from the seven principal Infectious Diseases in WARRINGTON, 1886–1892; from the Medical Officer of Health's Annual Reports.

—	Small-pox.	Scarlet Fever.	Measles.†	Diphtheria.	Typhus.	Typhoid and ill-defined or continued "Fever."	Whooping Cough.
Year ending Dec. 1886	0	10 cases	227 *houses*	5 cases	3 cases	23 cases	0
1887	0	74 „	134 *deaths*	4 deaths	1 case	43 cases	46 *deaths*
1888	7 cases	660 „	1 *death*	5 deaths	8 cases	21 cases and *12* others "simple" and "continued."	58 *deaths*
1889	0	256 cases (mortality 12·5 per cent.).	91 *deaths*	10 cases	0	36 cases	32 *deaths*
1890	0	131 cases	33 *deaths*	27 cases	0	28 cases	56 *deaths*
1891	0	70 cases	80 *deaths*	21 cases	0	41 cases (29 enteric).	19 *deaths*
1892	490	510 cases	13 *deaths*	14 cases	0	39 cases	37 *deaths*

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* Since the burning down of the Doëcker tent.

† Measles is not notifiable, but is only occasionally removed to hospital.

SECTION V.—POSITION OF THE OLD BOROUGH ISOLATION HOSPITAL AND THE SPREAD OF SMALL-POX AROUND IT.

Sub-section *a*.—Position of Hospital.

Map I. (at end) shows the position of the Old Fever Hospital at the northern end of Aikin Street. This street forms its only means of access, the hospital gates constitute in fact its northern boundary. Two of the houses abut on the hospital premises. This street has 79 houses, containing an aggregate of nearly 800 inhabitants, belonging entirely to the working classes.

Howard Street, where so many cases occurred, is the next street east of, and runs parallel to, Aikin Street.

Wakefield Street, where also a large number of houses became infected, lies parallel to and a little further east.

The workhouse is next door to the hospital on its east side, separated only by a high wall.

Altogether there is a population of 3,394 persons living within a radius of 300 yards of the Old Borough Fever Hospital, excluding the inmates of the workhouse.

Open Spaces.

There are three open spaces (marked *a*, *b*, and *c* on Map I.) where the children play and the neighbours gossip, close by the hospital.

Most infected District.

By far the most densely infected district of the whole town was a square-shaped area containing Howard Street, Wakefield Street, and Guardian Street, near the Old Fever Hospital. This area and *not the hospital itself* was the focus of the epidemic during August, September, and October.

Submitted herewith is a map of Warrington (too large for reproduction*) spotted with all the houses infected in August, September, and October, and it will at once be seen—

1. That at this time the White-Cross Ward (in the centre of which the old hospital is situated) was the most highly-infected district of the town.

2. That during these three months the infected houses congregate round a centre which lies neither in the hospital nor in the workhouse, but in space *b*, Map I. (*see* end). Two of the unisolated cases (Cases 10 and 13) seen by the doctor's assistant lived in Howard Street, abutting on space *b*, and a third (Case 6*a*) in Guardian Street (narrative, p. 9). These cases were the real causes of the high infection of this area.

3. That the condensation of infection during August and September is less noticeable than in October, when the infected houses became more uniformly scattered over the town.

Sub-section *b*.—Spread round the Old Hospital.

In presence of such potent causes for the propagation in and around this hospital mentioned in the preceding pages (pp. 9 *et seq.* and above), it would be fruitless to inquire in any great detail into the part, if any, which aërial convection played in the spread around the Old Fever Hospital in Aikin Street.

Nevertheless it may be thought expedient to give—

(1.) A chart showing the proportionate numbers of houses infected at different distances from the hospital. These figures have been worked out with great care on the large scale map just alluded to. The various small scale maps produced at the end of this report may also be consulted if desired. It was often difficult owing to the lapse of time to trace the source of infection, but in the great majority of instances this was revealed.

(2.) A table (XLIII.) showing the numbers in hospital and workhouse, which being so contiguous, might form a collective centre for aërial spread.

(3.) The prevailing winds may be seen on p. 71 and in Table LX. on p. 95.

The question of convection by aërial currents will be dealt with in connection with the temporary hospital (p. 69). But it may be observed in passing—

1. That the numbers of infected houses do not work out in perfect keeping with a theory of proportionate distances from the hospital as a centre.

2. That the largest proportion of infected houses is to be found in the 2–300 yard S.E. quadrant (the one containing Wakefield and Howard Street), not in the quadrant opposite to the prevailing winds, S.W. and S.E.

3. The real centre of maximum infection is not the hospital itself but the open space beside the street where the unisolated cases, under the care of the doctor's assistant, resided.

The next largest in the two adjacent ones containing Howard and Aikin Streets.

Table XLIII., showing the Number of Cases of Small-pox remaining in Hospital and Workhouse each Week.

Week ended—	Forward from preceding Week.	Patients admitted.	Patients discharged or died.	Patients remaining in Hospital at end of Week.	Workhouse.	Total in the two Buildings.
Saturday, July 30, 1892 -	0	1	0	1	0	1
„ Aug. 6 „ -	1	0	1	0	0	0
„ „ 13 „ -	0	0	0	0	0	0
„ „ 20 „ -	0	4	0	4	1	5
„ „ 27 „ -	4	9	1	12	1	13
„ Sept. 3 „ -	12	3	2	13	1	14
„ „ 10 „ -	13	2	2	13	5	18
„ „ 17 „ -	13	1	3	11	5	16
„ „ 24 „ -	11	1	11*	1	4	5
„ Oct. 1 „ -	1	0	0	1	3	4
„ „ 8 „ -	1	0	0	1	5	6
„ „ 15 „ -	1	0	0	1	4	5
„ „ 22 „ -	1	1	0	2	3	5
„ „ 29 „ -	2	1	0	3	3	6
„ Nov. 5 „ -	3	0	0	3	2	5
„ „ 12 „ -	3	1	0	4	2	6
„ „ 19 „ -	4	0	0	4	2	6
„ „ 26 „ -	4	1	1	4	1	5
„ Dec. 3 „ -	4	0	1	3	1	4
„ „ 10 „ -	3	0	3	0	0	0

* Transferred to new hospital on Sept. 19th.

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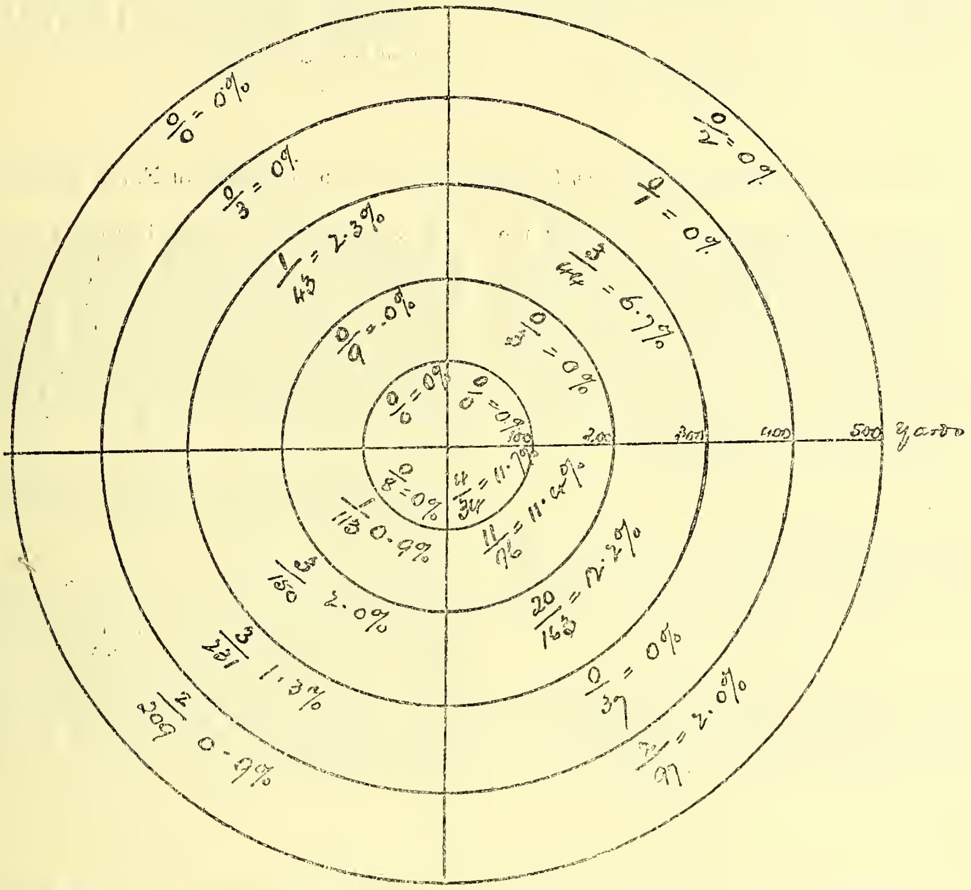
*10·56 feet to the mile.

AIKIN STREET AREA.

Per-centage of Infected Houses in each Zone and Quadrant around the Old Fever Hospital.

N.W. July 28th to October 4th, 1892. N.E.



S.W. S.E.

Note.—*Infected* houses form the numerators: *total* number of houses form the denominators of the fractions.

Table XLIV.

Summary of Aikin Street Area Chart.

Circles.	No. of Infected Houses.	Total No. of Houses in Area.	Per-centage of Infected Houses.
0—100 yards circle -	4	42	9·5
100—200 " -	12	221	5·4
200—300 " -	27	400	6·7
300—400 " -	3	272	1·1
400—500 " -	4	308	1·3
	50	1,243	Per-centage of whole area 4·0

Quadrants.	No. of Infected Houses.	Total No. of Houses in Area.	Per-centage of Infected Houses.
N.W. - - - - -	1	55	1·8
N.E. - - - - -	3	50	6·0
S.W. - - - - -	9	711	1·2
S.E. - - - - -	37	427	8·6
	50	1,243	

Sub-section c.—Borough Hospital a direct Source of Infection.

The foregoing results do not, on the theory of proportional distance, support the idea that the disease spread from the old hospital by means of aërial currents; there are, however, two circumstances which render it probable that the old hospital itself served as a means of direct infection :—

(1.) The escape of R——— during his delirium.

(2.) We have seen (page 11, *ante*) how the small-pox spread *within the hospital* amongst the scarlet fever patients therein, and how 4·7 per cent. of the various inmates, mostly of a well-protected age, were attacked; as compared with 0·8 per cent. in the workhouse adjacent, and with 1·2 per cent. in that town generally.

Sub-section d.—Facts against Aërial Spread in and around the Borough Fever Hospital.

We have further seen that there were, near the hospital, several unisolated cases which, without doubt, formed the centre of a large series of direct infections. (Narrative, pp. 9–12, *ante*). In view therefore of these and other conditions rendering direct infection (both immediate and mediate) not only possible but certain, it seems unnecessary to assume any theory of conveyance by air currents from the Hospital. There is, moreover, one fact which renders it unlikely that the disease was spread through the air beyond, the limited distance mentioned in the Introduction (p. 3).

The Workhouse is situated close beside the hospital, the premises being separated only by a high wall, and the nearest Workhouse building is only 125 yards away from the small-pox block. This institution was early involved in the epidemic. Six cases arose in it during the epidemic.

The first case, a well-vaccinated child of four years, had alternative sources of direct infection, and all the others could be readily traced to direct infection from this case or from one another. A diagram and particulars of these are to be found on p. 13, *ante*.

Now between August and December there were 712 persons of different ages and conditions, exposed in the Workhouse to any aërial influences emanating from the hospital. Nevertheless, there were only ·8 per cent. of these attacked (as compared with 1·2 per cent. of the whole town), and in all but one of these a clearly established direct source of infection was known to have existed. In the solitary exception, the first case, there existed several alternatives of infection in the usual way.

If, therefore, the hospital formed a centre for aërial spread, it is most remarkable that all these 706 persons should have escaped attack.

As it might be thought that they were protected by re-vaccination, a table is given at foot (Table XLIV*a*.) showing the actual numbers re-vaccinated in the Workhouse, from which it will be seen that only 59 were so protected prior to September 19th, when the small-pox cases were removed to the temporary hospital in Dallam Lane. Nor was there any other condition which could have prevented these persons from contracting the disease aërially, had the principle of aërial convection been in operation.

Sub-section e.—Aërial Spread from one pavilion to another of the Borough Fever Hospital.

As regards the theory of aërial spread of small-pox within the Hospital itself from one pavilion to another, a distance of 30 yards, we have seen (p. 11) that the facts are easily otherwise explicable. Case 3 arose in pavilion *a* (plan, p. 61), and was then removed, probably for purposes of isolation, over to pavilion *b*, in which a series of cases arose by direct or mediate infection from Case 3. The two other cases, not in this series, are equally well explained without the intervention of aërial convection (p. 11).

Table XLIV*a*.

Showing the number of inmates Re-vaccinated each week in the Warrington Workhouse, during the months of August, September, October, and November, 1892, out of a total of 712 who were within the Workhouse at the commencement of August (294 in number) or admitted subsequently; supplied by the courtesy of the Master, Mr. C. H. Ward.

During the week ended	August	6th	- - none were re-vaccinated.
,, ,,	,,	13th	- - ,, ,,
,, ,,	,,	20th	- - ,, ,,
,, ,,	,,	27th	- - 1 inmate was ,,
,, ,,	September	3rd	- - 1 ,, ,,
,, ,,	,,	10th	- - 21 inmates were re-vaccinated.
,, ,,	,,	17th	- - 35 ,, ,,

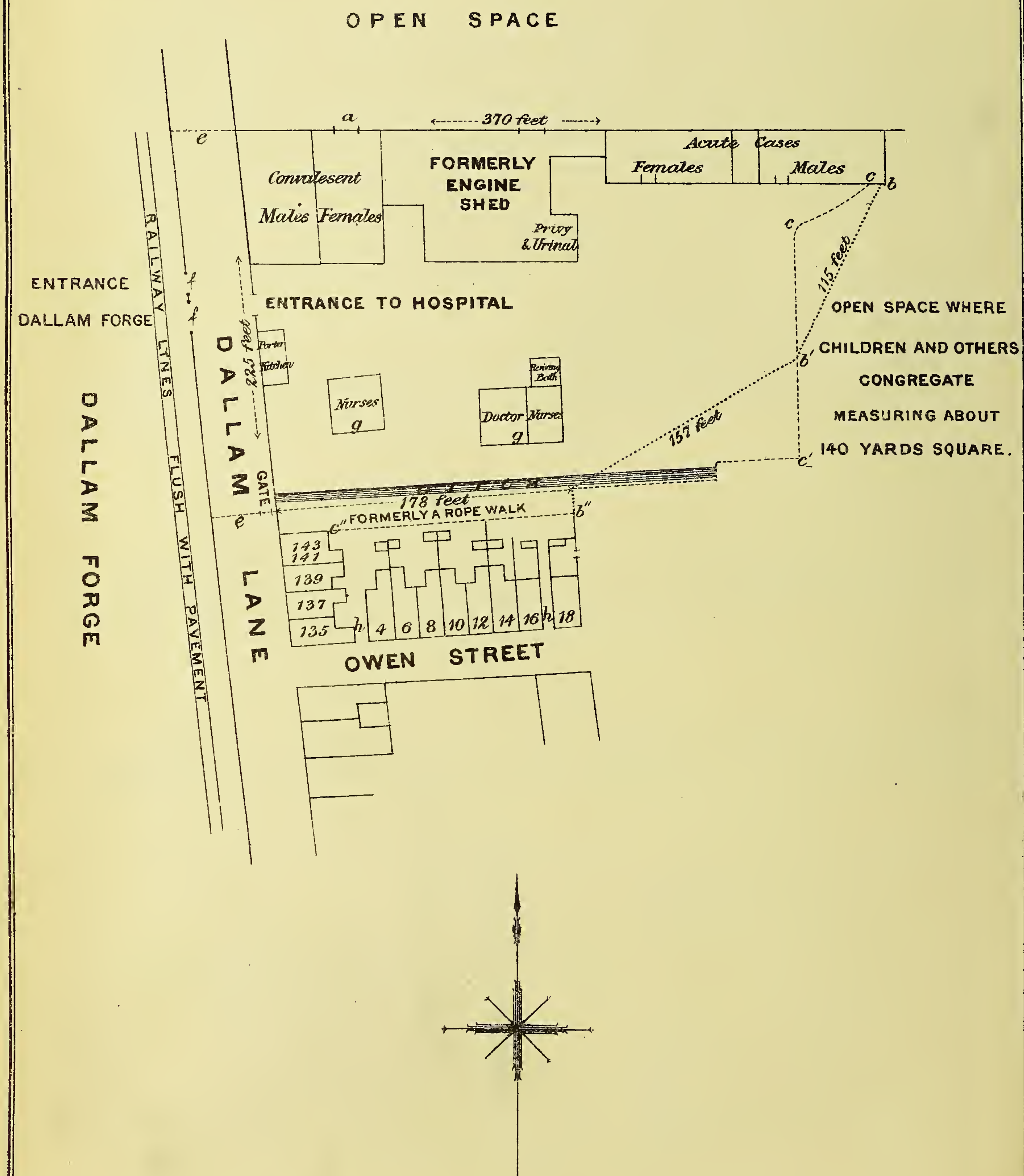
On September 19th the Small-pox patients were transferred from the Aikin Street Fever Hospital to the Temporary Small-pox Hospital in Dallam Lane.

During the week ended	September	24th	- - no inmates were re-vaccinated.
,, ,,	October	1st	- - ,, ,,
,, ,,	,,	8th	- - ,, ,,
,, ,,	,,	15th	- - 1 inmate was ,,
,, 3 weeks	November	5th	- - no inmates were ,,
,, week	,,	12th	- - 10 ,, ,,
,, ,,	,,	19th	- - 15 ,, ,,
,, ,,	,,	26th	- - 13 ,, ,,
,, ,,	December	1st	- - 1 inmate was ,,
Total during the 3 months			- 98

PLAN OF TEMPORARY SMALL POX HOSPITAL, WARRINGTON.

— OPENED SEP. 19. 1892 CLOSED AUGUST 1893. —

FORMERLY THE HAYDOCK IRON WORKS.



Scale Approximately 90 feet to 1 inch.

Wyman & Sons, Ld, Lith. 5748.2.94

SECTION VI.—NEW OR TEMPORARY HOSPITAL (HOPE HOSPITAL) IN DALLAM LANE.

Sub-section *a*.—Description of Hospital.

The circumstances which led to the establishment of this hospital, and its opening for the reception of small-pox patients on September 19th, 1892, were mentioned in Part I. of this report (p. 15, *ante*).

The building was formerly used as an iron works (the Haydock Iron Works), but it had not been occupied for some time. It was situated at the northern end of Dallam Lane near the northern fringe of the populated part of the town (*vide* map I., at end).

Communication with the outer world was obtainable up to about the middle of November, (*i.e.*, for 2 months after it was opened), through part of the palings on the east; and during the whole time the hospital was open over the low palings on the south side. In these latter there was even at the time of my visits in January and March, a large hole through which I easily passed over the ditch into the hospital confines.

Submitted herewith is a rough sketch of the premises, approximately to scale (90 feet to the inch). The explanation at the foot gives full particulars without the need of further description.

Sub-section *b*.—Capacity, and Staff.

By the courtesy of the Assistant Medical Officer of Health I was frequently enabled to visit the patients there. In December I always found the buildings very crowded. The beds were so close together as to scarcely leave room to pass between; yet, as already mentioned, the cases could not in November be received as fast as they arose.

When I first visited the building, on December 1st, there were 159 beds made up, all the males' beds were occupied and the most of the females'.

In the building devoted to acute cases (*see* plan) there were 37 beds and one cot on the females' side and 44 beds on the males' side; in the building devoted to convalescent cases there were on the first floor 28 females' and 28 males' beds, and on the ground floor 22 males' beds.

The following table (Table XLV.), supplied to me by the Assistant Medical Officer of Health, shows the numbers in hospital at the various week-ends:—

TABLE XLV.

Showing the Weekly Numbers of Small-Pox Patients in the Temporary Hospital.

Date of week-end.	Number in Hospital.
1892, September 27	65
„ 28	67
„ 29	68
„ 30	84
October 1	81
„ 3	89
„ 7	97
„ 12	105
„ 14	112
„ 17	114
„ 21	132
„ 25	130
„ 31	131
November 2	131
„ 11	154
„ 23	136
„ 30	136
1892, December 6	125
„ 18	102
„ 28	75
„ 31	65
1893, January 7	58
„ 14	61
„ 21	63
„ 28	66
February 4	55
„ 11	56
„ 18	50
„ 25	46
March 4	50
„ 11	51
„ 18	50
„ 25	56
April 1	45
„ 8	44
„ 15	42
„ 22	44
„ 29	54
May 6	46
„ 13	46
„ 20	40
„ 27	33
June 3	22
„ 10	18
„ 17	14
„ 24	11
July 1	4
„ 8	4
„ 15	3
„ 22	2
„ 29	2
August 5	2
„ 12	2

Note.—The Hospital was closed on August 29th, 1893.

Explanation of Temporary Small-pox Hospital.

Scale approximately 90 ft. to 1 in.

a.—Disused broken window covered with tarpaulin, which so escaped notice for a considerable time.

Old palings shown in broken lines, new ones shown in dotted lines.

c, c, b′, c′.—Old palings irregularly 4′ to 4′ 6″ high, with wide gaps between and below the boards through which children easily crept (*see* photo. p., 68).

b, b′, b″.—New palings about 7′ or 8′ high; strong, but with cracks through which people could talk. *b, b′*, ordered to be erected September 18th; *b′, b″*, ordered to be erected September 30th, not completed till middle or end of November.

b″, c″.—Old palings through or over which access to the hospital could always be obtained through the alleyways *h h*, for the rope walk was open and the ditch shallow.

e, e.—Barricades across Dallam Lane, erected first week in November.

f.—Entrance to the Dallam Forge used by the workmen at the forge for six or seven weeks after the hospital was opened; or later.

g, g.—These, the residential buildings for the staff, were purchased October 25th, and completed during the second week in November: up to that time the staff went to and fro daily to Aikin Street Hospital.

Staff.

During the two weeks succeeding the opening of the new hospital on September 19th, the Medical Officer of Health, in addition to his charge at the old hospital, and his duties as Public Vaccinator, Public Analyst, and Medical Officer of Health, had also charge of the new hospital.

On September 24th his son, Dr. J. Guest Gornall, was appointed Assistant Medical Officer of Health, and took charge of the patients in the new buildings on October 4th.

Until November 9th this gentleman, the entire nursing staff, and other officers slept at the old hospital (Aikin Street) going backwards and forwards each day to the Temporary Hospital (Dallam Lane); mostly, I was informed, in a cab.

There was naturally some difficulty in obtaining a sufficient staff of nurses under the circumstances and the convalescent patients had to be engaged to assist. The work devolving on those employed must have been very considerable under any circumstances.

I made careful inquiry during my visits in January into the movements of the staff, but though reasonable precautions seem to have been taken, I was not convinced of the impossibility of infection by these means, even apart from the practice of going backwards and forwards just alluded to. The difficulties to cope with were very great.

SUB-SECTION c.—ADMINISTRATION.

Owing to the urgent circumstances which led to the institution of this temporary hospital, it is not at all surprising that there were many imperfections in the isolation of the patients. The cases were so numerous compared with the means of dealing with them, that it was only natural that the ignorance and foolhardiness of the inhabitants should, of necessity, remain unchecked.

But in view of the inquiry as to how far, and by what means, this hospital served as a centre for the spread of the disease, *and whether it occurred by aërial convection or by direct means*, it is only right to record the following circumstances and incidents.

1. There being no disinfector at the temporary hospital the small-pox patients' own clothes were sent from the temporary hospital to the disinfector at the old hospital (Aikin Street) and brought back to the New Hospital.

2. A separate small-pox ambulance was established in November; until then the one ambulance from Aikin Street was sent for all cases of both scarlatina and small-pox.

3. Case 145 (in hospital, October 7 to about November 30) stated, voluntarily, that there was an old disused window on the north side of the temporary hospital premises covered only by a piece of tarpaulin, which escaped detection, and through which the friends of patients used to communicate with the patients and bring them spirits.

4. A woman (J. B.), living in Owen Street, voluntarily informed me in March 1893, that she had "seen" during the epidemic, "a good many people get over "the palings (*b″ c″* temporary hospital plan); and the "*workmen used to come out this way to get their beer.*" She also stated that "patients talked and shook hands "with their friends over the palings on east side up "till quite recently, and people used to get through "holes in the fence and visit their friends." There would be, she thought, 150 cases in hospital all this while.

5. Case 320, mentioned of her own accord that while she was in hospital (November 10 to November 30) "anybody could get over, and that the children did "get under and through the palings on the Winwick "Road side" (east).

6. Case 219 (eruption, October 23) states that he took the small-pox by talking over the Hope Hospital fence "with his friend, Case 114, just 14 days before the "eruption." (*See* Photo 3, opposite.)

7. P.C. 36 whom I found on patrol duty in Dallam Lane, on January 24th, 1893, replied to me, "Yes, we have "a good deal of difficulty to keep 'em (the visitors) off "the palings, especially during the dinner-hour." He referred to the palings on the east side of the hospital beside which the open space exists. (*See* Photo.)

8. Submitted herewith is a photograph (photo. 3) of the palings which I took in June 1892, and which shows that the same condition of matters still existed then. There were people on the fence at the moment of exposure. The picture is taken from, and shows part of, the open space on the east of the hospital, where the children may be seen playing and peeping through the palings. Over the hospital away to the westward are seen the chimneys of the Dallam and Bewsey forge. The old palings may still be seen on the left of photo., though at this time some new ones had been erected behind them.

9. It is but human nature for the children playing about the streets and spaces around the hospital to clamber on to and through the palings to satisfy their curiosity, and thus contract the disease (as in Cases 152, 563, and 607), or take the disease to their homes, like the children of Cases 193, 353, 354. The ambulance also excited the greatest interest, and the proceedings in and about the hospital generally. See other instances, p. 72.

DESCRIPTION OF PHOTOGRAPH 3. OPPOSITE p. 68.

Open space on east side of Temporary Small-pox Hospital which is the common place of resort for the inhabitants in the 189 neighbouring houses. The brick wall on *r* is the end of the hospital (opened September 19). The palings in the middle, through which the children and adults are peeping, and over which the patients are looking, were erected in the latter part of September. On the *l* are the old palings through and under which children and others could crawl (Hospital plan p. 67, *b*, *c*). Some new palings were erected behind them in November, but old palings like these existed always on the south side of the hospital (*b″ c″*). Beyond the Hospital are the chimneys of the Dallam and Bewsey Forge.

Photo 3, p. 68.

ROYAL COMMISSION ON VACCINATION.

Dr Savill's Report on the Warrington Small Pox Epidemic 1892-3.

Section VII. Aërial spread of Small Pox.

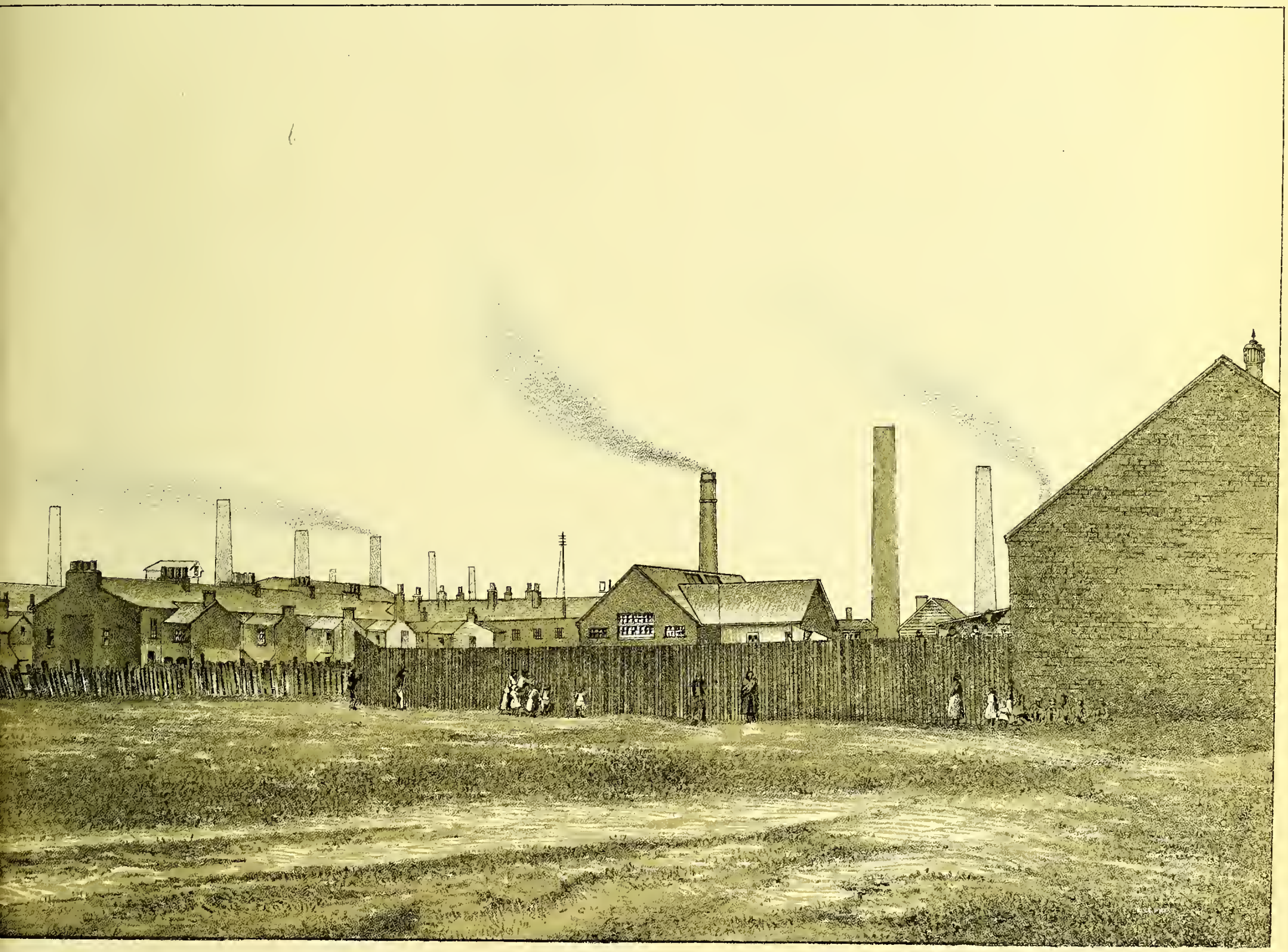


Photo 3. Open space on east side of Temporary Small Pox Hospital which is the common place of resort for the inhabitants in the 189 neighbouring houses. The brick wall on R. is the end of the Hospital (opened Sep. 19). The palings in the middle, through which the children and adults are peeping, and over which the patients are looking, were erected in the latter part of September. On the L. are the old palings through and under which children and others could crawl (Hospital Plan p. 67 b c). Some new palings were erected behind them in November, but old palings like these existed always on the south side of the hospital (b″c″). Beyond the hospital are the chimneys of the Dallam & Bewsey Forge.

SECTION VII.—SPREAD OF SMALL-POX BY AËRIAL CONVECTION, AROUND THE TEMPORARY HOSPITAL IN DALLAM LANE.

SUB-SECTION *a*.—PRELIMINARY CONSIDERATIONS.

How Small-pox may be spread, and limitation of this Inquiry.

There are three ways in which it is believed the infection of small-pox may be propagated—

1. *Immediate* spread from one patient to another, who usually develops the eruption 14 days after contact.
2. *Mediate* spread of infection by means of a third *person* who does not necessarily contract the disease himself—instances of which were mentioned in the spread within the workhouse (p. 13, *ante*),—or, by means of infection conveyed by some *inanimate object*, such as the mode of infection of Case *d*. (p. 8, *ante*) who was engaged in disinfecting the house of Case *a*.
3. *Convection by Aërial Currents.*—The poison of small-pox is believed in all cases to be conveyed through the air, and to find entrance to the respiratory passages. but in what follows *aërial convection will be taken to mean infection through the air at a distance of* 20 *yards and upwards*. It has seemed to me unnecessary, for practical purposes, to consider, on the present occasion, the dissemination of small-pox infection through the air within that distance (as mentioned on p. 3, *ante*). Material is not forthcoming for the narrower investigation, but it will be profitable to inquire into the truth of the allegation that the infection of small-pox was, in the Warrington Epidemic 1892, carried beyond that distance. Aërial diffusion and aërial convection are held to be synonymous.

The first is said to be the most usual method. The first two of these methods are admitted, but the third is much debated by equally high authorities on either side.

Conditions necessary to prove Aërial Convection.

Four of the means for establishing the truth of the aërial convection theory would seem to be by showing—

1. That the immediate and the mediate methods of infection were neither of them in operation in any given case or cases which form the basis of observation. In other words, that the mediate and immediate methods of infection were insufficient to account for all the cases in a given area.
2. That the proportion of infected houses or persons (whose infection is not accounted for by mediate or direct means) varies with the distance from the supposed centre. In actual practice, in an epidemic of any size, this is an almost impossible condition.
3. That the proportion of infected houses (where the infection is unaccounted for by direct or mediate means) in a given district around the supposed centre varies with the direction and the strength of the winds.*
4. That the proportion of persons so attacked varies with the number of cases collected in the supposed centre, and, as some say, with the stage of the disease which the cases have reached: in other words, the period of a "rising epidemic"—in the present instance October to December 1892.

Proportions 2 and 4 might also exist where the hospital is itself, as in the present instance, an unsuspected source of *direct* or *mediate* infection to the neighbourhood. The practical difficulties in carrying on an inquiry into this question are indeed very great.

Conditions necessary for an Inquiry as to Aërial Spread.

The difficulty, almost the impossibility, of *excluding the immediate and mediate sources of infection*, is generally the first bar to the proper investigation of the subject of aërial spread.

My experience from day to day in Warrington during the past year (1892-93) has impressed upon me the imperative necessity of five conditions for carrying an inquiry on this point to a favourable issue.

1. A certain "detective acumen" in the observer, to enable him to seize and follow clues as to infection.
2. Unlimited patience, perseverance, and time at his disposal.
3. A thorough knowledge of the habits and mode of life of the people, and of the locality.
4. A certain amount of intelligent assistance on their part, and especially their memory for transactions and occurrences on certain dates.
5. Not too long a period of time to elapse between the outbreak in their house, and the date of the inquiry. In the present investigation, all but four of the cases arose between July 26th, 1892, and May 10th, 1893, and the inquiries into them were made between December 1st, 1892, and July 25th, 1893.

These five conditions are, I believe, necessary to trace direct or mediate sources of infection. If one or other of them be wanting the inquiry may, and does, result in failure to find the true direct or mediate source of infection, and the observer is thus led to infer that the disease was contracted by aërial currents, or in some mysterious or inexplicable manner.

But, even if these exacting conditions be fulfilled, there are still many sources of error, which in actual practice cannot be eliminated. For instance, the interval between infection and the eruption of small-pox, though usually, is not necessarily limited to 14 days. Instances, where the source of infection was known, have come under my notice in which the interval was as short as 12, and others as long as 17 days.* Is it ever possible to ascertain sufficiently detailed particulars of the person's life during five or more days, and of all the people with whom he has come in contact, to be able absolutely to exclude direct or mediate infection? Small-pox is a disorder having a very high infectivity. The exposure may be very brief, and the distance not very close, if the person is what is known as "susceptible" to take the disease. Instances of this have been mentioned in these pages (*vide* p. 3, &c.).

Finally, before presenting such facts as have been collected, permit me to mention two points:—

First—The question whether small-pox will spread through the air to a distance, is, from a practical point of view not one of very prime importance, since, on account of the ignorance and foolishness of patients and their friends, and the inevitable human fallibility of members of the staff of a hospital, it is very difficult, at least it would seem so, to prevent a highly infectious disorder such as small-pox being spread around a hospital by these means. At any rate spread often does occur. In selecting, therefore, a site for the isolation of this disease it is well, on these grounds, to choose one at some distance from a densely-populated area.

Secondly.—When we possess a knowledge of the identity, habitat, and life history of the small-pox contagium, it will doubtless materially aid us in the solution of this vexed question. We should then, for example, be able to ascertain what effect the free exposure to currents of fresh air, which is one of the best known natural germicides, has upon this germ. Known instances of the lasting vitality of small-pox infection are rare, compared with other infectious fevers, from which it would appear that the virus of small-pox is comparatively short-lived. It would therefore be interesting to know whether currents of fresh air are capable of destroying this germ as they do other germs, or whether they are able to carry it to a distance unharmed.

---

* Some maintain that it is a gentle wind, or a foggy stagnant atmosphere which favours the spread of small-pox contagion through the air (*e.g.*, Waterhouse, quoted by MacVail).

* See also Report of Clinical Society referred to on p. 3, *ante*, where a series of cases of single exposure to infection are collected. In the greater number of those cases the eruption appeared between 14th to 16th day after infection; the shortest case appeared on 12th day, the longest on 23rd day.

SUB-SECTION *b*.—POSITION OF THE TEMPORARY HOSPITAL.

The temporary, or as it was named the Hope Hospital, was situated on the eastern side of the northern extremity of Dallam Lane (*vide* Map I. at end). On the opposite (west) side of Dallam Lane are the Dallam and Bewsey Iron Works, and abutting on the hospital premises (south) are the backs of 13 houses in Owen Street, (*see* plan of hospital, p. 67, *ante*) only separated by a disused rope walk, a dry ditch, and a broken paling which was never mended.

On the eastern side of the hospital is a piece of waste ground (*see* Map I. and photograph p. 68) measuring about 140 yards square, where the children were always to be seen playing, and where the occupants of the neighbouring houses in Owen Street, Stamford Street, Winwick Road, and other streets, congregated. The backs of the houses in these streets opened on to this space which seemed to be the resort not only for these but for all the houses of the neighbourhood. Rounders, hockey, and football were ordinarily played here (*see* photograph).

There are, as may be seen from the annexed diagram, 13 houses within 100 yards of the centre of the hospital wards, and a total of 1,075 houses within 500 yards containing an aggregate of some 6,000 persons. Out of these 1,075 houses, 112 (or 10·4 per cent.) became infected during October, November, and December.

It will be remembered that two or three weeks after the removal of the small-pox patients from the Old Fever Hospital to the temporary hospital on September 19th, the heart of the epidemic changed its position from the houses adjacent to the old hospital to the houses in the neighbourhood of the temporary hospital. This was not unnaturally attributed to an aërial diffusion of the infection. We will now look a little more closely into the facts.

SUB-SECTION *c*.—THE PROPORTION OF INFECTED HOUSES AT DIFFERENT DISTANCES FROM THE HOSPITAL.

Submitted herewith, but too large for republication, is a large scale Ordnance map (10 ft. to the mile) made in 1888 and corrected by me to date (1893), on which the infected houses are marked by spots.

The annexed diagram shows the number of houses in each circular area from 1 to 500 yards around the hospital, worked out from the large scale Ordnance map, and also the proportion of these which became infected in the three months October to December when the hospital contained most cases. *In nearly every instance diligent search revealed a direct or mediate source of infection :* in the remainder I had reason to believe that it was want of time or other facilities which prevented the clue being traced.

The proportions in the different zones as a whole work out pretty regularly inversely to distance from centre. But this is by no means so as regards the different quadrants. The south-east quadrant, for instance, the most populous one, shows from centre to circumference 60 per cent., 14 per cent., 16 per cent., 18 per cent., and 7 per cent. Full particulars are given in the diagram and table below it.

But if the hospital were a means of the *direct* spread of small-pox (without any aërial diffusion), and grounds have been given for believing that it was so (p. 68), it would be equally probable that the persons whose homes were situated nearer to the hospital would be more infected than those living at a distance. And those who reside near the open space beside the hospital would be more likely to frequent it than others living at a distance (photograph, p. 68).

Reduced maps spotted* with the position of houses which became infected in different months respectively, are also submitted (*at end of Report*). Their accuracy is necessarily not so minute as the large scale map on which the above results are based. It will be noticed that the largest number in this area occurred in November, and that the major portion of these are *congregated around the open space* (*d*) beside the hospital.

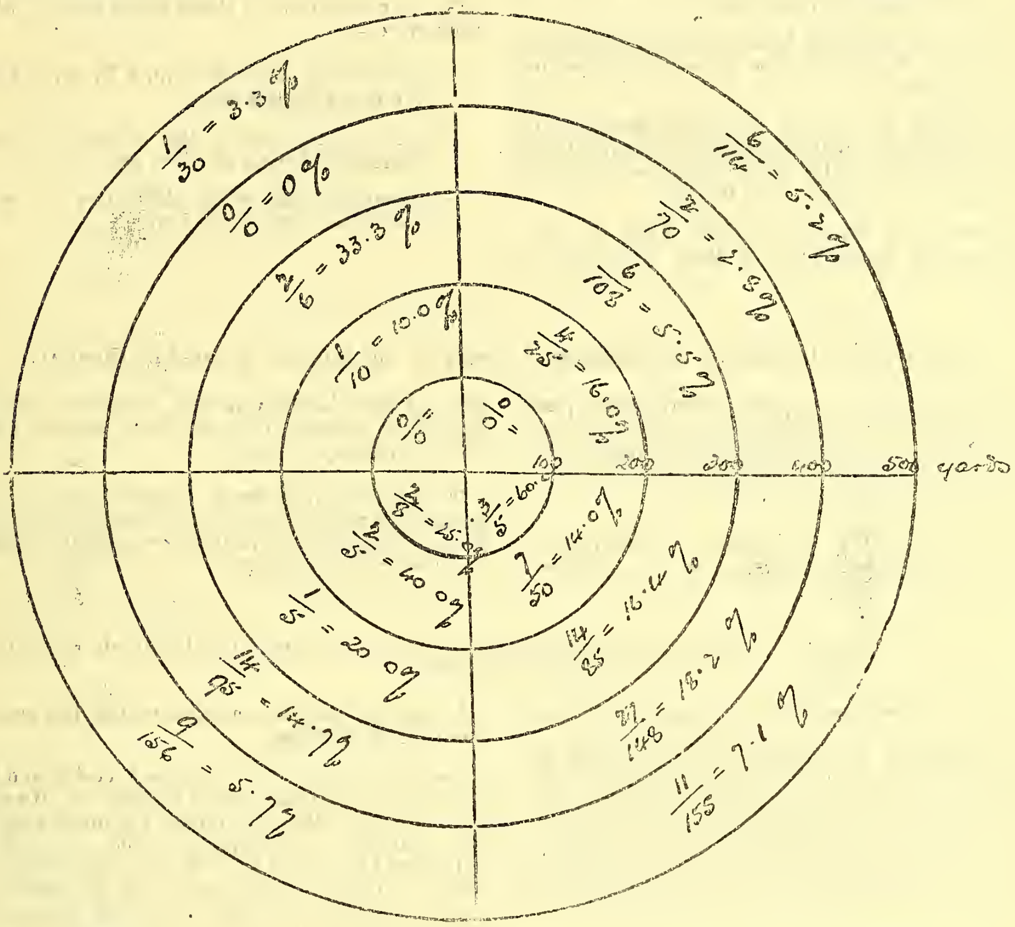
The *date of appearance of the eruption* has been taken as the guide here, for it is the most reliable and accurate date obtainable. If, therefore, it be desired to ascertain when infection was first brought into the houses marked, 14 days before the beginning and end of each month will give approximately (since the period of incubation of small-pox is not invariable) the periods when those houses had infection conveyed into them.

---

* By Mr. Ed. Gibbon, who possesses very complete knowledge of the locality, under my supervision.

Diagram showing the Per-centage of Infected Houses around the Temporary Hospital (Dallam Lane) at a time when the Hospital contained the largest number of cases (October 1st to December 31st, 1892). The figures here given are worked out from a large scale map, (10 feet to the mile), and therefore represent a high degree of precision. Houses through which the circles passed were counted in the zone in which their major portions lay.

N.W. N.E.



S.W. S.E.

Note.—*Infected* houses form the numerator, and the *total* number of houses form the denominator of each fraction.

TABLE XLVI.
Summary of Dallam Lane Chart.

Zones.	No. of Infected Houses.	Total No. of Houses in Area.	Per-centage of Infected Houses.
0—100 yards circle -	5	13	38·4
100—200 ,, -	14	90	15·5
200—300 ,, -	23	204	11·2
300—400 ,, -	43	313	13·7
400—500 ,, -	27	455	5·9
	112	1,075	Per-centage of whole area 10·4

Quadrants.	No. of Infected Houses.	Total No. of Houses in Area.	Per-centage of Infected Houses.
N.W. - - - -	4	46	8·7
N.E. - - - -	18	317	5·6
S.W. - - - -	28	269	10·4
S.E. - - - -	62	443	14·0
	112	1,075	

Sub-section *d.*—Relation between Position of Infected Houses and the Direction and Force of the Wind.

Direction of Wind.

The prevailing direction and force of the wind on different days are given in Part IV. of this report (p. 95) in an exhaustive table supplied to me by the courtesy of the Medical Officer of Health. The readings were taken at the Aikin Street Hospital, but the distance between the two hospitals is only 1,000 yards.

The prevailing winds during the months of October, November, and December were the S.W., 32 days, and the S.E., 22 days, *i.e.*, 54 days out of a possible 92. There were also—

8 days northerly winds.
20 ,, N.E. ,,
1 ,, E. ,,
1 ,, S. ,,
1 ,, W. ,,
7 ,, N.W. ,,

If, therefore, other causes of infection were excluded the N.E. quadrant should have been most infected, N.W. next, S.W. next, and S.E. least. But the percentage of infected houses shows the exact converse of this, viz., S.E. quadrant 14 per cent., S.W. 10 per cent., N.W. 9 per cent., and N.E. 6 per cent.

The number of infected houses is not, therefore, proportionate to the direction of the wind, during the three given months.

Force of Wind.

During October the records, so clearly preserved by the Medical Officer of Health, show that the winds in October were only moderate, the prevailing winds being S.W. 10 days, N.E. 9 days, and N. 8 days.

In November the winds were very light, the prevailing directions being S.W. 16 days, and S.E. 12 days.

In December the winds were only moderate, the prevailing directions being S.E. 10 days, N.E. 10 days, S.W. 6 days.

The only days during these three months with high winds were—

> October 19th, when 400 miles N. wind was registered during the day.
>
> December 6th, when 655 miles S.W. wind was registered during the day, and
>
> December 12th, when 355 miles W. wind was registered during the day.

Sub-section *e*.—Proportion of Infections relative to the Number of Cases in Hospital.

If the infection from a hospital or centre take place by aërial diffusion, one would expect to find that the number of infections bear a fairly direct proportion to the number of patients in hospital who presented the disease in an active state.

From the Table XLV., p. 67, *ante*, it will be seen that the largest number of patients in the temporary hospital were during October, November, and December. The average of these three months being 110, 139, and 92 respectively.

That is why these three months were taken in estimating the relative number of infections in the different zones. These three months represent all the conditions of a "rising epidemic."

Sub-section *f*.—Sources of *Direct* Spread in the Area around the Temporary Hospital, exclusive of the Factories.

These sources may be grouped under six headings:—

1. In investigating the question of aërial spread the very first thing to do is to ascertain whether *the hospital*, its patients and officers, are cut off from any direct communication with the outer world, and the outer world with them. Various incidents and circumstances have been mentioned in the preceding section (p. 68), which show beyond doubt that this was not the case.

2. The *open space* beside the hospital (hospital plan, p. 67, and photograph, p. 68) was a very potent factor in the direct spread (both immediate and through a third person). This space was the place of resort for all the people living round it, and also those coming from a distance who wished to communicate with their relatives and friends in the hospital. Instances of persons contracting disease in this way have been mentioned. Two other instances may also be given:—

The mother of Case 563, æt. 13 (eruption March 7th), living in Tanner's Lane, 600 yards from the hospital, stated "he was always near the palings on the open "space near the hospital—no keeping him away at "that time."

Case 607, æt. 9 (eruption April 6th), lived in Pierpoint Street rather less than 500 yards from the hospital, but separated from it by the railway line, and therefore giving a greater presumption of aërial spread. His mother stated that "two weeks before the eruption he "went up to the hospital with little M——, whose "father died in hospital, and peeped under the "palings."

The mother of Case 152 (æt. 7, eruption October 6th), living in Owen Street (plan, p. 67), affirmed: "He and "plenty other boys got on palings, which were very "old, and we leathered him off. Other mothers also "strapped their boys for the same. There were also "holes in palings on other side of rope-walk *through* "*which the children went* to watch the cases unloaded "from the vans," (photograph, p. 68, shows some of these palings on the left).

The children of all the houses situated anywhere near were in the habit of playing on this open space, and like the children of Cases 193, 353, and 354, took the infection home to their relatives. In the photograph of this open space submitted (p. 68), some children may be seen playing here.

3. Cases of *delayed isolation* within the area of supposed aërial diffusion.

Case 354, living in Owen Street, beside the hospital developed the eruption about October 12. He was never isolated at all. His wife who lived at home with him, but also went daily, as waitress, to the "F——s' Arms" in Dallam Lane, hard by, the chief place of resort of the Dallam forgemen. She waited on the visitors to this inn and looked after her unisolated husband during four weeks up to November 9th, when she herself began to sicken of the malady, having in the meantime conveyed the disease to two of the inmates at the inn (*vide infra*), and to an indefinite number of the Dallam forgemen, who were supposed also to be under the influence of aërial diffusion from their proximity to the hospital.

It was during the three weeks ending November 19th that no fewer than 43 of the Dallam forgemen developed the eruption (*vide* Table, p. 75).

Annie W——(Case 43), living at 20, Pierpoint Street, which is within the 500 radius, the other side of the railway, developed the eruption on September 8th, and remained at home until 19th. Her brother worked as a labourer all over the Dallam and Bewsey forge the while. Case 138 came a good deal in contact with this man and developed the eruption on October 4th.

Annie C——(Case 49), eruption September 9th, lived in the same street, and was at home for 10 days with the eruption out.

This highly-infected street, Pierpoint Street, where so many of the Dallam and Bewsey forgemen lived, being separated by the railway from the hospital, though within 500 yards distance of it, might be regarded as a good illustration of aërial conveyance. But, bearing in mind the gregarious habits of the people, it is not surprising that the disease should spread in succession from these and other unisolated cases in the street.

Table XLVII. gives the reference numbers of the cases, and the days spent at home with the eruption out, of persons who developed the rash between October 1st and November 12th inclusive, in the area comprised within 500 yards radius of the hospital and in the 500–1,000 zone. There were 65 in the former and 28 in the latter, making a total of 93 cases of delayed isolation within 1,000 yards of the hospital. The investigation was too laborious to pursue up to the end of December, but this is quite sufficient to show the extensive possibilities of direct infection in this area without the necessity of assuming aërial diffusion from the hospital.

TABLE XLVII.

Showing Cases left at Home for three or more Days with the Eruption out between October 1st and November 12th inclusive, within the 1,000 yards Area of the New or Temporary Hospital.

—		0 to 500 yards Area.	500 to 1,000 yards Area.
October	1	123 (3 days)	122 (3 days).
„	2	126 (3 days)	136 (5 days).
„	3	139 (4 days)	132 (5 days).
„	4	-	134 (3 days).
„	5	145 (3 days)	
„	6	149 (4 days) ; 151 (4 days) ; 152 (4 days.	
„	7	-	156 (4 days) ; 169 (15 days).
„	8	157 (3 days)	
„	9		
„	10		
„	11		
„	12	180 (5 days,	
„	13		
„	14	188 (5 days)	182 (4 days),
„	15	183 (3 days) ; 179 (4 days) ; 212 (9 days).	
„	16	186 (never) ; 190 (never) ; 193 (4 days) ; 194 (4 days).	197 (4 days) ; 203 (6 days)
„	17		
„	18		
„	19	204 (3 days)	
„	20	209 (3 days)	
„	21		
„	22		
„	23	214 (4 days)	
„	24	228 (3 days) ; 229 (4 days)	
„	25	233 (4 days)	
„	26	234 (3 days)	
„	27	246 (5 days)	
„	28	243 (4 days)	
„	29		
„	30	249 (3 days)	
„	31	253 (3 days)	
		Total - 28 cases.	Total - 9 cases.
November	1	297 (8 days)	254 (3 days) ; 256 (3 days).
„	2	258 (3 days) ; 259 (3 days) ; 274 (6 days).	
„	3	267 (3 days) ; 369 (never)	281 (6 days).
„	4	272 (4 days)	
„	5	278 (3 days) ; 279 (3 days) ; 294 (4 days).	265 (never).
„	6	296 (4 days)	284 (3 days) ; 285 (3 days).
„	7	300 (3 days) ; 303 (3 days) ; 311 (26 days) ; 312 (8 days) ; 314 (8 days).	299 (3 days) ; 304 (3 days).
„	8	313 (8 days) ; 317 (never) ; 320 (3 days) ; 321 (4 days) ; 330 (8 days) ; 347 (never).	342 (never).
„	9	310 (7 days) ; 315 (8 days) ; 329 (never) ; 350 (5 days).	307 (never) ; 334 (9 days).
„	10	327 (8 days) ; 353 (6 days) ; 363 (6 days) ; 365 (6 days).	325 (never) ; 343 (5 days).
„	11	341 (5 days) ; 352 (5 days) ; 360 (4 days).	337 (never) ; 345 (20 days) ; 358 (7 days) ; 385 (11 days).
„	12	328 (never) ; 355 (5 days) ; 374 (6 days) ; 405 (33 days).	351 (never) ; 359 (never).
		Total - - 37	Total - - 19
		Grand total - 65	Grand total - 28

Note.—The word " (never) " in this tablo should read (never removed from home at all).

Public-houses. 4. *Public-houses and Shops* where cases occurred within the area.

There are several much frequented inns and beer shops in this area. As an instance the following may be mentioned :—

There is abundant evidence to show that the "F—— Arms" in Dallam Lane, 150 yards from the Temporary Hospital, is a popular place of resort, and especially for the Dallam Lane forgemen, as the forge is on the opposite side of the street. Among the inmates of this inn two cases (mother and son, 353 and 454) arose in succession, infected from the waitress just now mentioned. One of these two cases was at home six days with the eruption out (November 10–15), and formed a source for a series of infections.

Shops. There are also many little *general stores and shops* within the area. The following are some instances where cases arose, and where the isolation was delayed (Table XLVIII.) :—

TABLE XLVIII.

Case No.	Day of Rash.	Day of Removal.	Kind of Shop.	Distance from New Hospital.
145 Other cases later.	Oct. 5	Oct. 7	Butcher	450 yards.
151	Oct. 6	Oct. 9	Grocer	475 „
180	Oct. 12	Oct. 16 (No disinfection).	Genera Store	200 „
365	Nov. 10	Nov. 15		
203	Oct. 16	Oct. 21	Greengrocer	550 „
193	Oct. 16	Oct. 19	General Store.	125 „

5. The *gregarious habits* of the inhabitants.

The families of the working classes of Warrington seemed very much to live in each other's houses in common. The children when not at school, or at play in the streets or open spaces, have the run of all the houses in the street. The women when not at house-work go in and out for a gossip. The men, if not at work, spend most of their time in the public-houses.

Case 420 attributed her infection to the fact that the children of a neighbour, who developed small-pox 13 days previously, almost lived in her house.

I found by personal experience that the passage of a wheeled vehicle along some of the streets was quite an event in the lives of some of these poor children. I often had a crowd of 40 or 50 close around me, and the removal of a patient in an ambulance was an occasion which seemed to demand much conflict as to who should get closest to it, and finally as to who should have the privilege of riding off behind it.

6. *Unsuspected sources of direct infection from a distance.*

Such cases often require much patient investigation, and many a clue has to be followed to a disappointing issue. Two examples of cases arising in this area in this way may be mentioned.

Case 246, residing 325 yards from the hospital, developed the rash on October 27th. He walked daily right across the area, through Owen Street, and past the hospital to his work situated only 250 yards the other side of the hospital. But the more obvious source of his infection was his sweetheart, who worked at a fustian cutter's in Wakefield Street outside the 1,000 yards area.

Case 179, residing 330 yards from the hospital, developed the eruption on October 15. He walked daily across the open space beside the hospital and down Dallam Lane to the brewery, 350 yards south of the hospital. But the more obvious source of his infection was also his sweetheart, a fustian cutter, who lived quite outside the area.

Summary and Conclusion.

Reference has been made in this sub-section to the many possible sources of *direct* infection which existed in the area around the temporary hospital, and illustrations given of how the open space beside the hospital, the unisolated cases at home (especially such as lived at shops), the public-houses, and the gregarious habits of the inhabitants may propagate the disease. Reference has also been made to the difficulty which sometimes presents itself in the residual cases of tracing the true source of infection, even apart from markets, theatres, and other places of amusement, where people congregate together. A large proportion of the cases in this area could be, and were, traced without much difficulty to a direct source, and I was led to believe that every one of them could have been traced without the necessary intervention of the hypothesis of spread by aërial currents, had the time at my disposal been unlimited.

The spread among the working people at the Factories in this area will next be considered.

SUB-SECTION *g.*—INCIDENCE of SMALL-POX amongst the hands at the FACTORIES around the HOSPITAL, and especially at the DALLAM and BEWSEY FORGE.

In order, finally, to ascertain whether aërial diffusion played an appreciable part in the propagation of small-pox around the temporary hospital in the Warrington epidemic, let us examine minutely the incidence of the disease among the workpeople employed at the various factories within 500 yards of the hospital.

The persons employed in these works spent their days, some of them, like the iron workers and fustian cutters, in a dusty atmosphere, others, like some of the brewers, in steam. All of them spent the working portion of their lives—that portion, be it remembered, in which respiration is far more active than at other times, when at rest or during sleep—under conditions eminently favourable to aërial infection, if such existed.*

The hands were for the most part adults, healthy, and vaccinated. As individuals they were strictly comparable; they differed only in their work, the position of that work in relation to the hospital, and the exposure to infection at home or elsewhere.

There were ten works or factories of any size within 500 yards of the Dallam Lane (Temporary) Hospital. Table XLIX. gives a summary of the particulars concerning them.

1. It will be noticed that there seems to be, in general terms, a tendency for those works nearest to be most affected; at any rate, those within the 250 to 320 yards zone are more affected than those in the 400 to 500 yards zone. On the other hand, an inspection of this table shows that, although the Dallam and Bewsey Forge and the Dallam Lane Brewery are both within the 300 yards radius of the hospital, and both abut on Dallam Lane; nevertheless, the first had a case incidence of 3·5 per cent. and the latter only 1·1 per cent. This important coincidence will be referred to again directly (p. 77).

2. It will be seen, also, that the direction in reference to the hospital varies considerably, most quarters being represented. The prevailing winds were S.W. 32 days, and S.E. 22 days (*see* page 71, *ante*). Nevertheless, it was not the factories on the N.E. and N.W. of the hospital which were most affected.

3. These particulars refer to the three months October to December 1892 when the largest number of cases were in hospital, and the epidemic was on the rise, therefore this source of infection was at this time at its maximum.

The occurrence of small-pox among the different workpeople at work in the area round the hospital does not, therefore, on the surface, satisfy three of the four conditions mentioned on page 69, *ante*, as necessary to establish the theory of aërial spread.

It will, moreover, be remembered that if the hospital itself be a source of *direct* infection it is only natural that those nearest should be most affected. We shall see that it was a direct source of infection, and that many other sources of direct infection were in operation to spread the disease among these workmen (p. 76).

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* It has been calculated by Dr. Edward Smith that a man walking four miles an hour inspires five times as much air as a man in the recumbent position (quoted in Parke's Hygiene, 8th edition, p. 3.

TABLE XLIX.

PARTICULARS of the position of the FACTORIES in the 500 yards Area around the temporary SMALL-POX HOSPITAL in Dallam Lane and the Incidence of Small-pox amongst the Workpeople, during the Months of October, November, and December 1892, arranged in Order of Distance from the Hospital.

Note.—These figures do not necessarily correspond with those given in Table LV., which refer to a different period of time.

Name of Works.	Kind of Work done.	Distance of centre of Works from centre of Hospital, and Direction.	No. of Hands Employed.*	No. of Hands who developed Rash from 1st Oct. to 31 Dec. 1892. †	Percentage Attack-rate.	Remarks.
London and North-Western Railway Engine Sheds.	Manufacturer of locomotives.	250 yards N.W. -	253	7, 15 $\frac{\text{VII.}}{7}$ 546 $\frac{\text{IX}}{25}$, 248 $\frac{\text{II.}}{18}$, 246 $\frac{\text{XI.}}{3}$, 353 $\frac{\text{XII}}{1}$, 458 $\frac{\text{VIII.}}{14}$, 347 $\frac{\text{XII.}}{14}$	2·7	
Dallam and Bewsey Forge -	Iron manufacture -	250 „ S.W. -	2,075	69, *see* Table LI.	3·3	
Dallam Wire Works, Smith and Son (adjacent to and practically part of the foregoing).	Wire drawing -	275 „ S. -	120	10	8·3	
Dallam Lane Brewery, P. Walker and Son.	Brewing, &c. - -	300 „ S.S.E. -	364	4, 303 $\frac{\text{X.}}{9}$, 296 $\frac{\text{XI.}}{22}$, 179 $\frac{\text{X.}}{5}$, 311 $\frac{\text{XII.}}{16}$	1·1	
Longford Wire Co. - -	Wire drawing and annealing.	320 „ E.N.E. -	149	3, 187 $\frac{\text{XI.}}{8}$, 462 $\frac{\text{XI.}}{13}$, 214 $\frac{\text{X.}}{4}$.	2·0	
Chandos Foundry - -	Iron making - -	400 „ S.S.E. -	25	0	0	
Wilkinson's - - -	Velvet cutting -	435 „ E.N.E. -	90	0	0	
Winwick Road Tannery -	Sizing - - -	450 „ S.S.E. -	55	1, 352 $\frac{\text{XII.}}{21}$.	1·8	
Orford Lane Glass Works, Ed. Bolton and Sons.	Sorting glassware -	480 „ S.E. -	92	1, 114 $\frac{\text{II.}}{9}$.	1·0	
Warrington Wire Rope Co.	Wire rope making -	500 „ S.S.W. -	86	0		

* Supplied by the courtesy of the managers of the respective works.

† Result of personal inquiry, checked by particulars from the respective managers.

Kind of Work.

The nature of their work may be regarded as an important factor in the aërial propagation of the malady amongst them, but it is an extremely difficult one to gauge. Free movement of air and ventilation is necessary to them all, and by the courtesy of the managers I had the opportunity of visiting these works. The iron and wire-work is a dirty, dusty, and generally a hot trade. Brewing and tanning are cleaner, but the former is attended by steam. Velvet-cutting is a very dry, dusty occupation, carried on almost entirely by girls.

There seemed in the Warrington epidemic to be no workers amongst whom small-pox spread with such rapidity as amongst the velvet—or, as they are called, the fustian-cutters, and if infection was being carried for 320 and 435 yards, these women and girls should at this time certainly have been largely affected; especially in that shop lying E.N.E. of the hospital where 90 girls were working daily, for there were 32 days of prevailing S.W. wind. In the early part of 1893 small-pox was introduced amongst Wilkinson's hands by direct infection and spread with great rapidity, but *not a single case arose amongst them in the last three months of* 1892, when the hospital was full to overflowing, and the prevailing wind blew their way.

Attack-rate.

It is unnecessary to give all the data collected concerning all the factories within the 1,000 yards radius with the same detail as the Dallam and Bewsey Forge. Similar conditions applied to them as to the latter, and in all there was a remarkable absence of unexplained infections. This is particularly so as regards the Dallam Lane Wire Works which had so high an attack-rate, p. 74). These works are practically part of the Dallam and Bewsey Forge. Their entrance is exactly opposite the F——'s Arms, where most of the men contracted the disease; this fact, and the other causes of direct infection, are quite sufficient to account, by direct infection, for the number of hands attacked.

SMALL-POX AT THE DALLAM AND BEWSEY FORGE.

Its Position.

We will now examine the incidence of the disease at the Dallam and Bewsey Forge, close beside the temporary hospital, which employed the largest number of workpeople (2,075), covered the largest area, and also had a high attack rate (3·4).

These are large iron works covering a triangular area nearly ¾ square mile in extent, lying along the western side of Dallam Lane, which alone separates them from the hospital at its northern end (*vide* Map I.). There are some railway tracks beside the lane, but they are quite flush and do not form any barrier, and several entrances exist down the lane.

Originally these works belonged to two firms, the northern half, known as the Dallam Forge, and the southern half, the Bewsey Forge. Now they are completely amalgamated. The apex of the triangle is to the north, opposite the entrance to the hospital, where there is also an open, gateless entrance to the forge for the Dallam men. The southern end or base is just within the 500 yards radius. The centre point lies 250 yards south-west of the hospital.

TABLE XXIV.

Showing Number of PERSONS working at the DALLAM and BEWSEY FORGE who developed the SMALL-POX RASH in each Week throughout the Epidemic.

Date.	No.	—
1892.		
Week ending—		
August 27 - -	2	
September 3 -	2	
„ 10 -	0	
„ 17 -	0	
„ 24 -	1	
October 1 -	1	
„ 8 -	3	
„ 15 -	4	
„ 22 -	4	
„ 29 -	4	During October, total 16 -
November 5 -	3	
„ 12 -	36	
„ 19 -	4	
„ 26 -	5	During November, total 48 -
December 3 -	1	
„ 10 -	1	
„ 17 -	0	
„ 24 -	1	
„ 31 -	2	During December, total 5 - -
1893.		
January 7 -	1	
„ 14 -	0	
„ 21 -	0	
„ 28 -	1	
February 4 -	0	
„ 11 -	0	
„ 18 -	0	
„ 25 -	0	
March 4 - -	0	
„ 11 - -	0	
„ 18 - -	1	
„ 15 - -	1	
April 1 - -	1	
„ 8 - -	1	
„ 15 - -	2	
„ 22 - -	0	
„ 29 - -	1	
None after this date.	—	
Total	83	

Spread amongst the Employés.

These workpeople were very early involved in the epidemic (p. 14), and also very extensively.

Table XXIV., here reproduced from p. 44, gives the weekly numbers of those who were attacked with small-pox. It will be seen that—

During October, 16 persons developed the eruption.
„ November, 48 „ „ „
„ December, 5 „ „ „

The heavy incidence (36 cases) during the week ending November 12th is a point worthy of particular notice.

The chief cause of the sudden outburst will be referred to on p. 76, namely, the waitress at the F——'s Arms. The probable reason of the succeeding decline of cases among these men is referred to on p. 44. The position of the department where each of these 36 cases worked when they contracted the disease is given below.

POSITION of the FORGE-MEN who developed the RASH during the week ending November 12th.

4 out of the 82 men employed at the 11″ bar mill (10).*

1 out of the 84 men employed at the warehouse (13).

15 „ 349 „ „ 7 and 8 inch bar mills (12).

2 out of the 178 men employed at the boiler and bridge yard (9).

6 out of the 149 men employed at the foundry and pattern shop (11).

3 out of the 329 men employed at the plate-mill (8).

1 „ 109 „ „ scrapping forge (2).

1 out of the 52 men employed at the wire-rod mill (1).

3 men worked all over the forge.

In Table LI., at the end of this section, are given particulars of all cases among the Dallam and Bewsey workmen from the point of view now under consideration, together with remarks upon the source of infection of those during September and October.

Conditions necessary to prove Aërial Convection.

Next, let us see if the facts as regards the spread in the *different* departments comply with the conditions mentioned on p. 69.

1. The question of the *direction of the wind* has not much bearing, as all the departments are, generally speaking, in one direction from the hospital, they all lie within the S.W. quarter.

2. As regards the *numbers in hospital* we are taking the three months when the hospital was twice as full as at any other time.

3. As regards the *proportion* of those attacked, and whether it varies with the distance from the hospital,—Table L. (top of next page), gives the results of my inquiries. It will be seen from column 6 that there is some general varying of proportion with the distance from the hospital, and this fact therefore answers one of the preliminary tests.

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* The numbers following the mills are the reference numbers to their position on Map I. (at end).

TABLE L.

Showing Per-centages of People Attacked in the different Departments of the Dallam and Bewsey Forge.

1. Shed or Mill.	2. Reference No. on Map. I.	3. Distance of Centre of Mill from Hospital.	4.† Total No. of Hands employed.	5. No. of Cases.	6. Per-centages.
11″ and 14″ bar mills	10	150 yards	82	7	8·5
9″ and 10″ bar mills	13	170 „	84	7	8·4
Dallam Forge and 7″ and 8″ mills.	12	200 „	349	22	6·3
Boiler and bridge yard	9	225 „	178	6	3·3
Foundry, joiners, and pattern shop.	11	250 „	149	8	5·3
Plate mill, smithy, fitting and wheel shop.	8	275 „	329	11	3·3
No. 3 forge	6	350 „	88	1	1·1
10″ and 11″ hoop mills, No. 3 sheet mills.	7	375 „	210	3	1·4
No. 2 forge	5	375 „	86	1	1·1
No. 1 forge	4	400 „	86	0	0
8″ and 9″ hoop mills, Nos. 1, 2, and 4 sheet mills.	3	440 „	274	5	1·8
Scrapping forge	2	450 „	109	4	3·6
Wire rod mill	1	475 „	52	3	5·7
Clerks and hands all over forge	—	—	104	5	4·9

Particulars supplied by the courtesy of the manager of the works Mr. Thos. Morris. Probably the hands working "all over forge" have been included among those of the several mills.

4. But before adopting the theory of the spread by aërial currents to account for the higher proportion nearer the hospital, let us see first, whether the *hospital itself formed a direct source of infection*, and secondly, whether there were *other sources of direct infection* to these men.

(1.) *Hospital a source of direct Infection to the forgemen.*

Facts have been revealed in the preceding pages which show that the hospital itself was undoubtedly capable of forming a centre of direct infection. Now this was especially so for the Dallam men, that is those men employed in the northern and nearer part of the great iron works, for there existed an entrance (marked *f* on Map I. and plan of hospital) through which it was the common practice for them to pass in and out to work. This gate was never during the whole of the epidemic completely shut, and it was not until the first week in November that the barricades (marked *e e* on Map I. and plan of hospital) were placed across Dallam Lane. But, even then, all this did was practically to convert the upper part of the iron works into continuity with the hospital curtilage.

It will be remembered that the heaviest incidence amongst the forgemen was during the second week of November.

Now, as we have seen, a number of the men from this forge were constantly in the hospital under treatment, and many instances came under my notice where *forgemen contracted the disease by communicating with their fellow workmen in hospital.* And again, the open space on the east of the hospital was another most vulnerable point, and several instances came to my knowledge where forgemen had apparently contracted small-pox by holding communication with their fellows on this side also.

It seemed to me that the circumstances just mentioned were quite sufficient to account, not only for the large number of men attacked in the Dallam Forge, but also that the larger number should be attacked in those departments nearest to the hospital.

(2.) *Other possibilities of direct Infection to the forgemen.*

As regards other possibilities of direct infection they were very numerous and may be divided into four groups:—

(1.) Previous cases in their own homes of which a large number came under notice.

(2.) Unisolated cases living near them at home whom they visited.

(3.) Unisolated cases in their fellow-workmen's homes or other means of mediate infection by a third person.

(4.) Visits to infected public-houses and shops.

In Table LI. some remarks are appended to each case as to the source of infection during September and October.

No doubt, after the arrangement of the gate (*f*) just alluded to, opposite the hospital, the most potent source of infection at the Dallam and Bewsey Forge was a public house to which the men largely resorted, situated on the opposite side of Dallam Lane, and known as the "F—— Arms." Here it was that the wife of an unrecognized and unisolated case waited upon them from the 12th October, when her husband developed the eruption, till the 11th November, when she herself developed the rash.* It was here, also, that two of the inmates contracted small-pox from the same source, and they also were unisolated for some days. And there were also, in this neighbourhood, a good many small beer shops and general shops where cases occurred, and some of them, as Case 376, were never removed.

The following are interesting, not only as instances of direct infection to the Dallam and Bewsey Forge men, but also as examples of the way in which small-pox may be spread:—

Martha E—— developed the rash on 17th August; remained at home one month. During all that time her father and one of her brothers worked in the puddling mill, and another brother worked as a labourer all over the forge. There was no disinfection after she was removed on 9th September, for two weeks.

A man H—— developed the rash on 16th September. and was never removed. His next-door neighbour, who came to see him frequently, worked in the 11 and 14 inch bar mills all the while, and finally took the disease.

A man S—— developed the rash on 7th October, and was unisolated till 21st October. A man named M——, living in the same house, worked from the 7th to the 15th October at the Foundry, when he finally developed the eruption himself.

A man T—— developed the rash on 8th November, and was not removed till 15th November. A man named B——, living in the same house, worked at the plate mill all the time.

Richard W—— developed the rash on 9th November, and was never removed; his daughter developed the rash on December 2nd, and was also never removed. Both of them were about the house all the time. Two sons worked in the smithy and in the office respectively, all the time, except during two weeks after the second case.

Walter R—— developed the rash on the 10th November, and was never isolated, but was about the house all the time. His father and brother worked about in different parts of the Bewsey Forge all the while.

A man R—— developed the rash on the 9th November; he was never isolated. His father and brother worked at the forge all the time, until the father developed the rash on the 29th November.

Charles S—— developed the rash on 30th October; he was both unisolated and unrecognised. His brother worked as a painter all over the forge all the time, until he and a sister developed the eruption on the 12th of November.

John H—— developed the rash on the 11th November and was never isolated. A man living in the same house worked as a labourer in different parts of the forge until the 22nd November, when he also took the disease.

Anne D—— developed the rash on the 8th September. Her stepfather worked "up and down" the Bewsey Forge until she was removed on the 19th of that month.

George H—— lived in Portland Street, which is within the 500 yards area. He worked at the Dallam Wire Mill, and developed the rash on the 21st October. Nevertheless, the real source of his infection was his brother, who developed the rash 15 days before, and whom he frequently visited at that time, although he lived at some little distance.

Herbert S—— developed the rash on October 13th. He worked at the puddling mill of the forge and lived in Erwood Street, also within the 500 yards area; but the real source of his infection was his wife, who nursed Case 122, 13 days previously, and who conveyed the infection home to him.

Thomas P—— (Case 63) developed the rash on 20th September. He was the fifth person to be attacked at the Dallam and Bewsey Forge, but the real source of his infection was his mother-in-law, Mrs. M——, who used to come in and out at the same time that she was nursing the C——s (Cases 57, 98, and 112).

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* It was during the week ending November 12th that 36 cases arose amongst the forgemen. (Table, p. 75 *ante*.)

Summary and Conclusion as regards Aërial Spread.

It has been mentioned that in the early part of the epidemic the cases arose chiefly beside the *Old* or *Borough* Hospital, and that after September 19th, when the cases were transferred and admitted to the Temporary or improvised Hospital, they arose chiefly beside the latter. But a closer inspection of the facts shows that the infected houses in both instances were grouped around centres, lying not within the respective Hospitals themselves, but in open spaces *situated in the neighbourhood of the Old and Temporary Hospitals* respectively (b, c, and d in Map I.). There is good evidence to show (1) that these spaces, where the children played, and the neighbours gossiped, were important factors in the propagation of the disease; (2) that the unisolated cases in the houses around these spaces were potent sources of *direct* infection; (3) and that (as an inevitable consequence of the hasty action of the authorities when in presence of a panic) both of the hospitals were themselves sources of *direct* and *mediate* infection.

There are, however, two circumstances which seem to speak in favour of the possibility of spread by aërial currents, viz.:—

(1.) The high attack-rate at the Dallam and Bewsey Works, adjacent to the Temporary Hospital.

(2.) The per-centage of each department of those works varying in some degree with the distance from the hospital.

On the other hand, there are three important considerations which are against this view, viz.:—

(1.) That both of the facts just mentioned are otherwise explicable, the hospital having been a source of direct infection on both its E. and W. sides and through the gate of the works; and the facts are also largely explicable by the infection from the "F—— Arms," and many other direct sources which have been enumerated on p. 76.

(2.) The fact which seems to me to tell most against the aërial view was one similar to the exemption from unexplained sources of infection in the workhouse cases, adjacent to the *old* Fever Hospital, mentioned on p. 66.

Walker's Brewery, a large establishment employing 364 hands, is situated, like the Dallam and Bewsey Forge, within 300 yards radius of the *new* hospital. Yet, not only was the attack-rate in this brewery considerably smaller, but all the four cases which occurred there are perfectly well explained by direct infection. Thus, Case 179 developed the eruption on October 15th, having contracted the disease from "sweethearting at Platt's fustian cutting shop," from which shop eight cases were removed in succession about this time. Case 303 developed the rash on November 17th, having contracted the disease from an adjacent house which became infected 14 days before. Case 311 developed the rash on November 7th, having contracted the disease from his wife, who developed the eruption 14 days previously. Case 296 developed the rash on November 6th. This man (M——) was obliged to walk from his home to his work down Stamford Street beside the hospital, at that time not adequately shut off from the open space, which was a source of so many direct and mediate infections. It was some time before any more satisfactory evidence as to this man's infection appeared. At length I ascertained that he spent the whole of one Friday evening at a beer-house, sitting close beside a man named Thos. D——, whose wife had developed the eruption the day before, and had only just been removed to the small-pox hospital that day (Oct. 21). Thirteen days later M—— sickened, and on Sunday morning, November 6, developed the eruption, 15 days after the incident.

(3.) Again, why were the 90 fustian-cutters at Wilkinson's, who were only 135 yards further away in a different direction, and the 25 forgemen at the Chandos Foundry, who were only 100 yards further away in the same direction as the Brewery, *wholly exempt* from small-pox during these three months, if aërial convection, was in operation? Or again, why were the Warrington Wire Rope Works exempt if small-pox infection can be carried to such a distance? The facts relating to the other works are similar to those concerning the Brewery, and, so as not to overburden this Report with detail, only those referring to the brewers are reproduced.

Perhaps it may still be asked why was the attack-rate in this Brewery, compared with that in the Forge so small? The brewers were not re-vaccinated till November 17th and 24th (when 337 were done), and up to that time they were exposed to all the influences of a rising epidemic, the hospital (opened September 19) was full, and the centre of the brewery was practically as close as the centre of the forge; and finally, if the aërial diffusion of small-pox had been in operation, the brewers ought to have been more infected with the small-pox, for they spent their days, when respiration is far the most active, at near distance from the hospital; and many of them walked to and from work across the open space beside the hospital. Every possible source of information was exhausted to elucidate the exemption of the brewers, fustian-cutters, the Chandos Iron Workers, and other workers from unexplained infections, and the only possible explanation was that the aërial convection of small-pox was not in operation. The real reason why so few of the brewers were attacked was because they were not exposed to such potent sources of *direct* infection as the forgemen. The entrance to the brewery was not, like the northern entrance to the forge, in direct continuity with the entrance of the temporary hospital (p. 76); the brewers had not, like the forgemen, unisolated cases of small-pox, or relatives of small-pox cases wandering about their midst (pp. 9, 14, and 76); nor did they communicate with their fellow workmen in hospital (p, 76); and finally, having an ample supply of beer they had no occasion to visit the "F——s Arms" and other places (p. 76). The absence of these and other sources of direct infection sufficiently explains the comparatively low attack-rate among the brewers. And, as we have seen, every single case was traceable to direct infection.

Conclusion.

Finally, as regards the whole subject of the conveyance of small-pox to a distance through the air, it is of course conceivable that a person exposed to a direct source, and to a mediate source, and also to an aërial current of small-pox infection, may have contracted the disease from any one of these sources, albeit exposed to all three. In that case to establish the possibility of a direct source does not absolutely exclude the others.

Nevertheless, speaking from my own experience at Warrington, in those cases, and they formed the majority, where there was time to thoroughly follow up the clues as to infection, a direct source, or else a mediate source of infection invariably became apparent, without recourse to the hypothesis of aërial convection.

The disease always seemed by me to spread directly along the lines of human contact,—which are doubtless very much controlled by the position of a person's habitation. For this reason, therefore, it is not surprising to find that the cases should appear, when marked on the maps, in localised groups.

The exemption of two such important communities as the inmates of the Workhouse and the workers at the Brewery from any cases arising within them, which could not more reasonably be explained by direct infection, seems to me to be against the view that conveyance by aërial currents was in operation at all.

The persons living in the Workhouse spent their whole days and nights in the closest possible proximity to the old hospital. How was it that there is such an absence of unexplained sources of infection? Let reference be made once more to that accurate and lucid account by the Matron of the spread by direct infection in the Workhouse buildings, which has been summarised on pp. 13 and 14, *ante*. Her facts and dates were most clearly and forcibly stated, and resisted the severest cross-examination. And again, the workers at the Brewery, breathing five times as much germ-laden (?) air all day as men do in repose at night, contributed only four cases out of a staff of 364 men, and there was no instance of unexplained source of direct infection among them.

On these grounds, therefore, and in view of the facts set forth in this and the three preceding sections, it may be affirmed that the diffusion of small-pox by aërial currents as above defined, was not an appreciable factor in the Warrington epidemic; and further, that a close examination of the facts renders it unnecessary to assume any such hypothesis.

TABLE LI.

Showing Particulars of all the Cases of Small-pox among the Workmen at the Dallam and Bewsey Forge from August 18th, 1892, to May 10th, 1893, with Remarks on the Source of Infection of those in September and October.

No. of Case.	Book Reference.	Name.	Age.	Date of leaving Work.	Date of Rash.	Date of Removal to Hospital.	Position in Forge at Time of Seizure, and Ref. No. on Map.	Home Address.	Remarks as to Source of Infection.
8	$\frac{\text{V.}}{1}$	C——, Emanuel	16	14th May	18th August	21st August	All over forge (0)	Guardian Street	Lived in highly infected district beside old hospital.
11	$\frac{\text{II.}}{20}$	B——, William	26	—	23rd ,,	24th ,,	7″ bar mill (12)	Winwick Street	Source of infection unknown.
21	$\frac{\text{VI.}}{6}$	B——, John	37	Worked all while son at home.	31st ,,	3rd September	(Near 2)	Howard Street	Previous case at home (Case 10).
22	$\frac{\text{V.}}{20}$	T——, Henry	37	—	3rd September	5th ,,	2 forge (5)	Priestley Srreet	Previous case at home (Case 6).
68	$\frac{\text{XIII.}}{17}$	P——, Thomas	27	18th September	20th ,,	22nd ,,	9″ and 10″ bar mills (13)	Pierpoint Street	Mother of Case 31 conveyed infection.
112	$\frac{\text{XIV.}}{8}$	C——, Edward	41	—	30th ,,	30th ,,	No. 1 sheet mill (3)	Cockhedge Lane	Previous case at home (Case 57).
138	$\frac{\text{XV.}}{3}$	K——, James	25	—	4th October	6th October	7″ and 8″ bar mills (12)	Dolman's Lane	Talking with patients over fence.
142	$\frac{\text{VI.}}{3}$	C——, Benjamin	20	3rd October	6th ,,	7th ,,	11″ and 14″ bar mills (10)	Howard Street	Next door, Case 63, rash $\frac{16}{\text{IX.}}$; never isolated.
150	$\frac{\text{XI.}}{15}$	G——, Joseph	28	3rd ,,	8th ,,	9th ,,	8″ and 9″ hoop mill (3)	Warburton Street	Walked across open spaces beside hospital, which at this time was not adequately shut off from hospital.
180	$\frac{\text{XII.}}{12}$	W——, James	15	—	12th ,,	16th ,,	9″ and 10″ bar mill (13)	Appleton Street	Communication with hospital.
354	$\frac{\text{XII.}}{\text{V.}}$	B——, John	31	—	12th ,,	0	Engine (8)	Owen Street	Free communication with hospital at back of his house.
188	$\frac{\text{XI.}}{7}$	N——, John	22	13th October	14th ,,	18th October	Smithy, fitting, and wheel shop (8).	Winwick Road	"Pals in hospital," whom patient visited.
189	$\frac{\text{XI.}}{26}$	W——, James	24	13th ,,	15th ,,	18th ,,	9″ and 10″ bar mills (13)	,, ,,	"Friends in bar mill."
193	$\frac{\text{XII.}}{2}$	B——, Albert	25	13th ,,	16th ,,	19th ,,	Wheel shop (8)	Dallam Lane	House close beside hospital, which was unisolated at this time.
235	$\frac{\text{IV.}}{20}$	B——, Robt.	17	17th ,,	16th ,,	21st ,,	7″ and 8″ bar mills (12)	Priestley Street	Two previous cases at home.
204	$\frac{\text{XIII.}}{11}$	G——, John	26	—	19th ,,	21st ,,	Scrap forge (2)	Pierpoint Street	No information (gone away).
208	$\frac{\text{XII.}}{31}$	H——, George	26	18th October	21st ,,	21st ,,	Wire mill (1)	Portland Street	Brother, Case 149, rash $\frac{6}{\text{X.}}$ whom he visited on the $\frac{7}{\text{X.}}$
219	$\frac{\text{XI.}}{31}$	B——, Albert	24	20th ,,	23rd ,,	24th ,,	Plate mill, smithy (8)	Winwick Road	Contact "with his chum Richard R—— (Case 114), who was in hospital from October 1 for 3 weeks."
222	$\frac{\text{XI.}}{9}$	H——, William	17	—	24th ,,	25th ,,	7″ and 8″ bar mills (12)	,, ,,	Two previous cases in adjacent houses.
227	$\frac{\text{XIII.}}{7}$	M——, Thos.	45	15th October	25th ,,	25th ,,	1, 2, and 4 sheet mills (3)	Pierpoint Street	Previous case at home, 169 $\frac{7}{\text{X.}}$ unisolated for two weeks.
243	$\frac{\text{XIII.}}{10}$	M——, Geo.	24	25th ,,	28th ,,	31st ,,	Plate laying on line (9)	,, ,,	Unisolated; Case 169 close by.
249	$\frac{\text{X.}}{18}$	S——, James	23	27th ,,	30th ,,	1st November	No. 3 sheet mill (7)	Watkin Street	Cases in adjacent houses.

TABLE LI—*continued.*

No. of Case.	Book Reference.	Name.	Age.	Date of leaving Work.	Date of Rash.	Date of Removal to Hospital.	Position in Forge at Time of Seizure, and Reference No. on Map.	Home Address.
297	XIII. 26	J——, Henry	34	29th October	1st November	8th November	Foundry, joiners' and pattern shop (11).	Catherine Street.
369	X 23	H——, Wm.	17	2nd November	3rd „	0	Plate mill (8)	Philip Street.
270	XV. 32	R——, Edward	22	3rd „	6th „	7th November	Foundry, joiners' and pattern shop (11).	Wright Street.
271	IX. 6	P——, Edward	23	2nd „	6th „	7th „	7″ and 8″ bar mills (12)	Hardy Street.
276	II. 7	R——, Chas.	36	—	6th „	7th „	Foundry, joiners' and pattern shop (11).	Kendrick Street.
283	II. 39	M——, Geo.	42	—	7th „	8th „	All over forge (0)	Oliver Street.
286	II. 21	T——, William	19	5th November	7th „	8th „	Foundry, joiners' and pattern shop (11).	Winwick Street.
293	XI. 19	S——, Joseph	44	4th „	7th „	8th „	14″ mill (10)	Longford Street.
299	XIII. 20	H——, Robt.	20	5th „	7th „	9th „	Foundry, &c. (11)	Catherine Street.
300	XIII. 28	B——, Chas.	28	5th „	7th „	9th „	11″ mill (10)	Catherine Street.
312	X. 13	P——, William	16	5th „	7th „	14th „	9″ and 10″ bar mills (13)	Watkin Street.
314	XI. 20	A——, Jabez	42	—	7th „	14th „	7″ and 8″ bar mills (12)	Longford Street.
298	II. 24	M——, John	25	5th November	8th „	9th „	All over (0)	Silver Street.
313	XI. 30	A——, Henry	17	8th „	8th „	15th „	11″ and 14″ bar mills (10)	Winwick Road.
317	XIII. 31	H——, Alfred	50	5th „	8th „	0	7″ and 8″ bar mills (12)	George Street.
330	X. 11	T——, Chas.	21	29th October	8th „	15th November	7″ and 8″ bar mills (12)	Watkin Street.
306	XIII. 16	F——, Alfred	23	7th November	9th „	15th „	Puddling forge (12)	Pierpoint Street.
310	XII. 27	H——, Thos.	39	8th „	9th „	15th „	7″ and 8″ bar mills (12)	Buckley Street.
315	XI. 25	H——, Edward	32	5th „	9th „	16th „	7″ and 8″ bar mills (12)	Winwick Road.
316	XI. 18	S——, William	25	8th „	9th „	10th „	11″ bar mill (10)	Jockey Street.
318	III. 2	C——, Edward	49	—	9th „	10th „	Foundry, joiners' and pattern shop (11)	Harts' Place, Bridge Street.
319	VII. 8	S——, John	20	5th November	9th „	0	Boiler, &c., Bridge Yard (9).	Welfield Street.
326	XIII. 2	W——, Richard	55	—	9th „	0	Smithy, fitting and wheel shop (8).	Lilford Street.
329	XI. 24	R——, John	19	5th November	9th „	0	Foundry, joiners' and pattern shop (12).	Winwick Road.
324	VII. 6	S——, John	28	—	9th „	—	Wire mill (1)	—
338	VIII. 26	S——, James	24	—	9th „	15th „	7″ and 8″ bar mills (12)	Lincoln Street.
344	IX. 3	E——, Jas.	36	5th November	9th „	0	7″ and 8″ bar mills (12)	Chorley Street.
325	IX. 8	R——, Walter	17	8th „	10th „	0	All over (0)	Norman Street.
337	XIII. 13	M——, John	40	8th „	10th „	17th November	7″ and 8″ bar mills (12)	Pierpoint Street.
335	V. 17	P——, Jabez	32	8th „	10th „	17th „	7″ and 8″ bar mills (12)	Wakefield Street.
336	X. 12	P——, Wm.	31	5th „	10th „	15th „	7″ and 8″ bar mills (12)	Watkin Street.
365	XII. 12	S——, Percy	26	7th „	10th „	15th „	Boiler, &c., Bridge Yard (9).	Appleton Street.
357	XV. 18	R——, Matthias	24	9th	11th „	17th „	7″ and 8″ bar mills (12)	Lord Nelson St.
358	II. 12	M——, William	25	—	11th „	17th „	Foundry, &c. (11)	Cambria Place.
328	XIII. 18	G——, Henry	32	8th November	12th „	0	Locomotive department (8).	Pierpoint Street.
355	XI. 17	M——, William	23	8th „	12th „	16th November	7″ and 8″ mills (12)	Warburton Street.
356	XV. 20	S——, Alfred	25	—	12th „	9th December	Smithy, fitting and wheel shop (8).	Admiral Street.
374	XII. 13	S——, Richard	33	—	12th „	17th November	Scrap forge (2)	Appleton Street.
333	X. 24	S——, Wm.	19	—	13th „	0	9″ mill (13)	Philip Street
375	V. 22	S——, Jas.	21	12th November	15th „	19th November	Forge	Nicholson Street.

TABLE LI—*continued.*

No. of Case.	Book Reference.	Name.	Age.	Date of leaving Work.	Date of Rash.	Date of Removal to Hospital.	Position in Forge at Time of Seizure, and Reference No. on Map.	Home Address.
370	XIII. 8	W———, John	17	—	17th November	18th November	No. 3 sheet mill (7)	Pierpoint Street.
373	XI. 21	W———, John	38	16th November	17th „	0	Foundry, joiners' and pattern shop (11).	Longford Street.
387	VII. 19	S———, Joseph	16	—	19th „	0	Roll turning shop (8)	Froghall Lane.
388	XIII. 9	M———, Wm.	31	17th November	20th „	22nd November	Wire mill (1)	Pierpoint Street.
406	XI. 14	M———, Jas.	20	12th „	21st „	26th „	7″ and 8″ bar mills (12)	Amtrobus Street.
398	XII. 11	R———, Thos.	17	19th „	23rd „	25th „	11″ and 14″ bar mills (10)	Kerfoot Street.
392	XIII. 16	N———, Wm.	19	17th „	24th „	25th „	Forge all over (0)	Pierpoint Street.
408	X. 25	W———, Richd.	25	22nd „	25th „	27th „	No. 3 forge (6)	Philip Street.
416A	XI. 24	R———, Richd.	17	25th „	29th „	0	7″ and 8″ bar mills (12)	Winwick Road.
457	XIII. 29	McH———, John	17	3rd December	7th December	9th December	9″ and 10″ bar mills (13)	Hoyle Street.
473	V. 6	T———, James	42	—	19th „	19th „	Plate mill (8)	Knight's Yard.
484	XIV. 20	K———, James	40	22nd December	25th „	27th „	Bridge yard (9)	School Brow.
490	XIII. 21	G———, Wm.	37	—	31st „	4th January	Puddling forge (12)	Catherine Street.
496	XIV. 20	K———, Ernest	18	—	6th January	8th „	(9)	School Brow.
528	XIV. 5	S———, Richd.	26	—	25th „	26th „	Scrap forge (2)	Scotland Road.
574	XIX. 9	R———, John	33	—	14th March	15th March	14″ mill (10)	Morris Road.
581	XIX. 21	S———, Henry	19	—	24th „	25th „	No. 3 sheet mill (7)	Orford Lane.
602	XIX. 7	T———, Michael	18	—	1st April	3rd April	No. 4 hoop mill (3)	Portland Street.
605	XX. 1	A———, Joseph	21	—	5th „	6th „	Plate layer (nr. 9)	Wilson Pattern Street.
639A	XVIII. 10	H———, Wm.	25	—	12th „	0	Fitting shop (8)	Cartwright Street.
614	XIX. 6	C———, Wm.	14	—	14th „	14th April	No. 9 hoop mill (3)	Portland Street.
633	XVIII. 17	D———, Jos.	22	—	23rd „	25th „	10″ mill (13)	Workhouse.

Photo 4, p. 81

ROYAL COMMISSION ON VACCINATION.

DR. SAVILL'S REPORT ON THE WARRINGTON SMALL POX EPIDEMIC 1892-3.

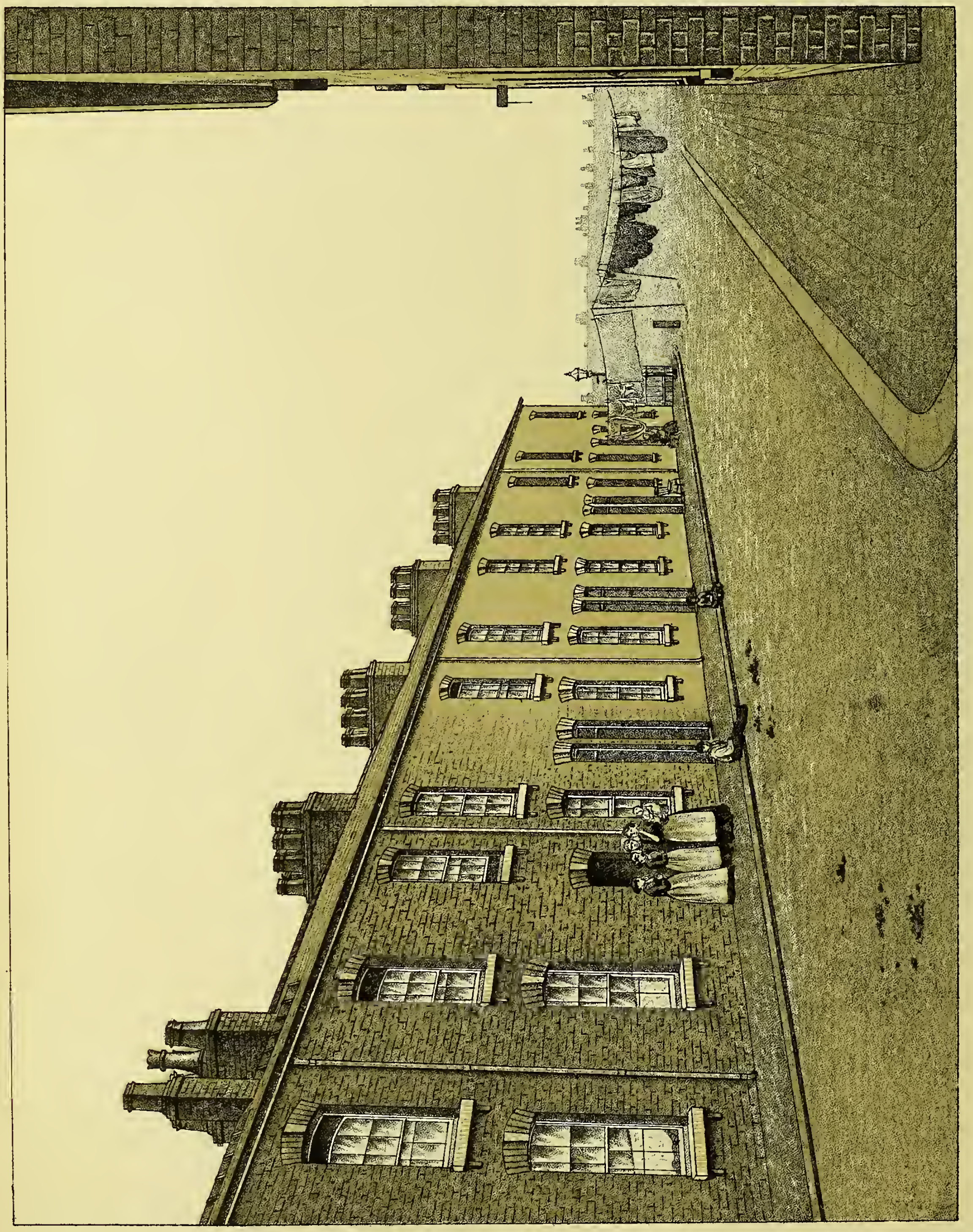

Photo 4. Owen Street, Warrington, showing the type of artizan dwelling uniform found in the town, and the common practice among the inhabitants of gossiping and playing in the streets.

PART IV.

Position and Sanitary Condition of Warrington; Social and Hygienic Condition of the People; Meteorology.

Having dealt in preceding parts with vaccination and other means specially directed to the prevention of small-pox, it will be necessary, in conclusion, to consider, without too much detail, the effect of the environments of the individual and various social and medical conditions which may in a more or less direct manner affect (*a*) the spread of the infection of small-pox, or (*b*) the severity of the disease, and to present them with a view to ascertain whether they may be regarded as contributory causes of the epidemic now under consideration.

There will be seven sections :—

	Page.
I. The topography, area, and geology of the town	81
II. Vital statistics and the relation of small-pox to occupation and social class	84
III. Health of the community, prevalence of zymotic and other disease	88
IV. Habits and social conditions of the people	91
V. Sewerage and disposal of refuse	92
VI. Water and food supply	93
VII. The weather	94

SECTION I.—POSITION, HOUSES, AREA, AND SOIL OF THE TOWN.

Warrington is a manufacturing town situated in the southern part of Lancashire a little to the south of, and midway between, Liverpool and Manchester.

It was incorporated as a borough in 1847, and the present confines of the borough (*vide* Map I. at end), gives an area of 2,004 acres.

It is built on the north bank of a bend of the river Mersey, whose sluggish stream is much polluted with trade produce and sewage. The town itself is situated on a low-lying plain.

Four lines of railway run through or beside it, and there were at the time of my visit (1892–3) 147 factory chimneys emitting black smoke daily, Sundays only excepted.

A perpetual smoke hangs over the city like a pall, through which the sunlight only occasionally penetrates, and which seems to cast a shade over the inhabitants, whose sombre faces are a faithful index of their habits and occupations.

Streets and Spaces. (See map I.)

The streets are paved with the usual granite cubes, and the side walks mostly with black glazed tiles, but in some places the paths are made of ashes from furnaces.

There are four main streets running from about the centre, North (Horsemarket Street), South (Bridge Street), East (Buttermarket Street), and West (Sankey Street).

In the older parts of the town, notably on the east side of Bridge Street, Silver Street, Pinner's Brow and Cockhedge Lane, the houses are close together and often back to back, being approached only by some narrow alley-way, but in the newer parts of the town the streets are generally 30 or more feet wide. Here also at intervals are to be found open spaces which the inhabitants dignify with the name of "fields." They are for the most part old brick-fields where rubbish has been, and in some cases still is, shot. It is therefore artificially made ground. These spaces serve for play grounds for the children and resorts for the adults (Photo. 3, p. 68). The importance of these spaces as a means of spreading infection has frequently been mentioned in Parts I. and III. There is a small park beside the town hall.

Houses and Overcrowding.

The houses are very uniformly of a type considered suitable for artizan occupation — two-storied, four or six-roomed houses arranged in terraces, generally with a little back yard (Photo. 4 opposite).

The very usual size of the living-room, or "parlour-kitchen," is 11 or 12 feet square by about 7 feet high.

The disease certainly seemed to have a tendency to attack persons living in the smaller, and also the more crowded houses.

Taking the infected houses of the whole town, it may be seen, from Table V., p. 23, in Part II., that the infected houses contained an average of 5·8 inhabitants per house, as compared with 5·4 persons per house taking the whole town (*see* next page).

In the Aikin Street area, Table VI., p. 24, Part II., I had the opportunity of gauging from my own inquiries the relative numbers of persons living in the invaded and uninvaded houses respectively in one particular district, and it will be seen that whereas the uninvaded houses contained an average of 5·0 persons per house, the invaded houses in this area contained an average of 6·4 persons per house.

Nevertheless, in considering the question of overcrowding as a contributory cause in the spread of small-pox, it must be remembered that over-crowding may increase the chances of infection by more people going in and out of the house.

Area and Density of Population.

The area and confines of the Warrington town and Warrington Union have been altered several times in recent years since the incorporation of the town as a Borough in 1847. Finally in 1891 we find the following divisions:—

1. For Parliamentary and Registration purposes the district consists (as given in the 54th Annual Report of the Registrar-General, 1891) of—

——	Area.	Population.
	Acres.	
Sub-district Warrington - -	2,887	49,124
Sub-district Latchford - - -	3,820	7,979
Total - - -	6,707	57,103

2. The Warrington Union, for Poor Law and Vaccination purposes, comprises the foregoing, together with other outlying sub-districts and townships, making a total area of 31,168 acres, and a population of 84,922. These figures are also taken from the Registrar-General's Report, 1891. Particulars may also be found in the Corporation's Year Book, 1892.
3. The Borough of Warrington, which corresponds with the Urban Sanitary District, and is the area dealt with in the foregoing pages, had in 1891 an area (as shown in Map I.) of 1,968 acres, on which stood 9,630 inhabited houses, and a total population of 52,743.

Table LII., given at foot, is constructed from particulars supplied to me by the Registrar-General, excepting the first column, which is the result of a survey made by the Corporation, and published in their proceedings of February 3rd, 1891.

The density of population varies considerably in different parts of the town, but, taking the borough as a whole, there were in 1892 :—

5·0 houses per acre,
5·4 persons per inhabited house, and
27 persons per acre.

The most densely populated portion of the town is St. John's Ward, *vide* Map I., which contains 66·8 persons per acre. (Table LII. gives further particulars.)

In order to arrive at some idea as to whether the density of population affected the spread of the small-pox it would be necessary to know—

(*a*.) The proportion between the per-centage of houses per acre in each ward, and the per-centage of infected houses in that ward; and

(*b*.) The proportion between the per-centage of population per acre in each ward, and the attack-rate in that ward.

But even then the result might be considerably influenced by the ignorance, vice, dirt, and destitution which generally pervade the more densely populated parts of a town.

Geology.

The borough surveyor informs me that the soil on which the town is built consists for the most part of clay, which extends to an average depth of some 20 feet, covered by some 3 or 4 feet of loose surface earth, which generally consists of rubbish.* Near to the river, and for a depth of 30 or more feet beneath the surface quicksand is found. At the north-east corner of the town gravel and rocksand occur to a depth of about 15 feet, beneath which is the outcrop of the red sandstone.

On consulting the Memoirs of the Geological Survey of England and Wales, by the courtesy of the Curator of the Geological Museum in Jermyn Street, I find that Boulder Clay forms the surface soil for 14 miles east and west of Warrington, and 5 miles due north of the River Mersey, with here and there a small patch of Shirdly Hill Sand (post-glacial deposit), never more than about 100 square yards, and 6 or 8 feet thick. Thus, the soil on which the town, and the country for many miles round, is situated, is in the main a clay one. In Sankey Street there is a small patch of gravel, but at the Dallam Lane ironworks there is 23 feet of Boulder Clay, below which a narrow layer of sand (0–10 feet), separates it from the rock below.

The rock beneath Warrington and the country for many miles is the Red Sandstone.

TABLE LII.

SHOWING the NUMBER of HOUSES and INHABITANTS in each of the MUNICIPAL WARDS within the BOROUGH of WARRINGTON (as extended in 1890) from the Census Returns of April, 1891, corresponding with the URBAN SANITARY DISTRICT.

——	Area in Acres.*	Houses.			Population.		
		Inhabited.	Uninhabited.	Building.	Persons.	Males.	Females.
Bewsey Ward -	291	959	16	2	5,491	2,772	2,719
Fairfield ,, -	323	967	18	11	4,956	2,403	2,553
Howley ,, -	133	1,180	62	2	6,412	3,330	3,082
Latchford ,, -	326½	1,086	15	8	5,785	3,018	2,767
Orford ,, -	230½	832	20	22	5,303	2,926	2,377
St. Austin ,, -	188	715	8	9	3,912	1,835	2,077
St. John ,, -	131	1,685	58	13	8,760	4,336	4,424
Town Hall ,, -	111	1,143	79	3	6,102	3,080	3,022
Whitecross ,, -	234	1,063	10	39	6,022	3,070	2,952
Total -	1,968	9,630	286	109	52,743	26,770	25,973

* From the Proceedings of the Town Council, February 3, 1891.

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* The well at the Whitecross Wire Works, not far from Aikin Street Hospital, passes (according to Dr. Ballard's Report on the Sanitary condition of Warrington presented to the Local Government Board, February 1872, p. 13) through—

3·0 ft. surface earth.
4·6 ft. clay,
2·6 ft. sand.
2·6 ft. marl.
10·0 ft. blue clay.
4·0 ft. sand.
1·0 ft. dirt, sand, and gravel.
9·0 ft. quicksand.
2·0 ft. gravel.
Rock.

TABLE LIII.

SHOWING THE SEX—AND AGE—DISTRIBUTION OF THE POPULATION ENUMERATED AT THE CENSUS IN 1891 WITHIN THE BOROUGH OF WARRINGTON.

All Ages.		Under one year.	1.	2.	3.	4.	Under five years.	5.	10.	15.	20.	25.	30.	35.	40.	45.	50.	55.	60.	65.	70.	75.	80.	85.	90.	95.	and up-wards.
Persons.	Males and Females.																										
Persons - -	52,743	1,708	1,535	1,447	1,481	1,454	7,625	6,629	6,115	5,626	5,152	4,295	3,886	3,123	2,643	2,153	1,858	1,214	1,079	655	420	166	87	13	4		
Males - -	26,770	861	773	712	732	714	3,792	3,287	2,964	2,910	2,678	2,249	2,052	1,661	1,408	1,099	936	601	529	295	201	70	28	8	2		
Females - -	25,973	847	762	735	749	740	3,833	3,342	3,151	2,716	2,474	2,046	1,834	1,462	1,235	1,054	922	613	550	360	219	96	59	5	2		

SECTION II.—VITAL STATISTICS AND THE RELATION OF SMALL-POX TO OCCUPATION AND SOCIAL CLASS.

Population.

In 1851 the census population was 22,894.
In 1861 " " " 25,953.
In 1871 " " " 32,144.
In 1881 " " " 41,452.
In 1891 " " " 52,743.

Between the dates of the Censuses of 1881 and 1891, the boundaries of the Urban Sanitary District of Warrington were altered. The population of the area now included was, at the date of the census of 1881, 42,552; thus showing an average annual increase of 1,019 during the last 10 years.

Now the natural annual increase, due to the excess of births over deaths, for the 10 years ending in 1891 is 856,* and therefore one is justified in presuming that the excess of immigration over emgration is a factor in the growth of the population.

It is worth while noting in passing that in the future this excess will probably be greatly increased, having regard to the newly completed Manchester Ship Canal, which is to have a lock less than two miles from the town.

The estimated population at Midsummer, 1892, was **54,084**, and this is the figure that has been taken in the calculations throughout this Report.†

Table LIII., on p. 83 *ante*, and Table LIV., given below, which have been supplied to me by the courtesy of the Registrar-General, give particulars concerning the sex, and age-distribution of the population, and the numbers and ages of persons engaged in the seven principal industries in the borough of Warrington.

Birth Rate, 1892.

The births during the 52 weeks of the year 1892 were:—

Males - - - -	1,111
Females - - -	1,056
Total - -	2,167

Birth rate 39·9.‡

Death Rate, 1892.

The total number of deaths during the 52 weeks ending December 31st, 1892, was 1,267, being 665 males and 602 females, 35 of these persons belonged to parts outside the borough of Warrington; and if these be deducted, the death-rate for the year 1892 was 22·77 per thousand, which is 1·86 lower than the year 1891.*

The several causes of death during the year 1891 are given in Part II., page 38, *ante*.

It will be noticed that the death-rate of Warrington is somewhat high.

Relation of Small-pox to Occupation.

With a view to ascertain the incidence of small-pox on the different occupations, I addressed a letter of inquiry to each of the leading employers of labour in Warrington, 48 in number, and in all cases received a reply containing the information required.

Table LV. gives a synopsis thereof.

It cannot be said from this that any occupation was particularly prone to take small-pox. One of the ironworks employing 182 men entirely escaped. Others had some of their men affected, and the largest, the Dallam and Bewsey Forge had, for reasons previously given, a very heavy incidence.

Fustian or velvet cutting, an important industry, is done almost entirely by girls and women, and is carried on in long rooms of various sizes. It will be noticed that some of these shops or rooms escaped. In others the attack-rate was very heavy. The occupation is a dusty one, attended by the formation of "fomites," and when once infection was introduced into a room, it spread amongst the girls working in that particular room, with great rapidity,—greater rapidity than it did in other occupations.

TABLE LIV.

Showing the Numbers and Ages of Persons returned in the Borough of Warrington at the Census of 1891 as engaged in the seven principal Occupations.

Occupations.		Total.	Ages.							
			10.	15.	20.	25.	35.	45.	55.	65 and upwards.
Wire Workers - -	M.	1,020	68	242	156	260	150	89	43	12
	F.	7	1	4	1		1			
Blacksmiths - - -	M.	509	10	58	80	126	109	76	30	20
	F.									
Iron and Steel Workers -	M.	1,791	54	254	314	474	373	222	84	16
	F.									
Tanners - - -	M.	554	17	118	104	135	86	65	21	8
	F.	4		1			2	1		
Cotton Manufacture - -	M.	193	25	52	24	35	25	13	15	4
	F.	1,103	139	473	247	153	56	24	9	2
Fustian Manufacture -	M.	102	2	8	8	20	26	20	14	4
	F.	1,223	158	368	293	241	102	42	15	4
Brewer - - -	M.	149	14	16	31	31	16	24	15	2
	F.	3		1			1	1		

Note.—Among the brewers here are included only those, apparently, who are actually employed in brewing, not the draymen, labourers, and others.

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* For particulars of these 10 years, *see* Medical Officer of Health's Report for 1892.

† This figure is taken from the Medical Officer of Health's Report for 1892.

‡ Medical Officer of Health's Report for 1892.

* Medical Officer of Health's Report for 1892.

TABLE LV.

Trades Inquiry.

Description of Trade and Name of Employer.	Department.	No. of Hands Employed.		Total.	Cases of Small-pox.
		M.	F.		
COTTON.					
Armitage & Rigby, Ld. (Cockhedge Mills).	Weaving shed -	26	680	706	9
	Mule spinning -	60	—	60	1
	Ring „ -	2	25	27	1
	Winding room -		120	120	—
	Twisting „ -		30	30	—
	Throstle „ -		50	50	—
	Card „ -	14	80	94	—
				1,087	
IRON.					
Monks, Hall & Co., Ld. (Monk's Forge).	Forge - -	195		195	9
	Mills - -	73		73	10
	Tube works -	88		88	2
				356	
Dallam and Bewsey Forge.	Forge, mills, and various shops.	2,075		2,075	83
Chandos Foundry -	- - -	*	*		*
Dallam Wire Works (W. Smith & Son).	Wire drawing -	70		70	5
	Mechanics' shop -	4		4	1
	Warehouse - -	6		6	1
	Spooling rooms -	8		8	1
	Patent house -	16		16	0
	Yard - -	9		9	2
	Round wire room office.	7		7	1
				120	
Whitecross Wire Works.	Rod mill wire rolling.	14		14	—
	Forges - -	62		62	—
	Rod mills wire rolling.	60		60	3
	Netting shop -	55		55	—
	Nail shop - -	10		10	—
	Galvanizing -	82		82	2
	Offices and stores -	20		20	1
	Cleaning house:—annealing pots.	14		14	—
	Rope mill - -	65		65	2
	Wire-drawing mill	180		180	1
	Rod mill - -	30		30	—
	Fitters, engine-drivers, stokers, joiners, and smiths.	100		100	—
				692	
Rylands, Bros., Ld. (Church Street Wire Works).	Oiling - -	4		4	1
	Galvanizing -	23		23	1
	Wire netting -	8		8	1
	Wire drawing -	83		83	4
	—— - -	582		582	—
				700	
N. Greening & Sons, Ld. (Crown Street Wire Works).	Wire weaving -	36	35	71	—
	Fitters, &c. -	42		42	—
	Wire cleaning -	7		7	—
	Engine-drivers -	2		2	—
	Joiners, &c. -	24		24	—
	Warehouse - -	7		7	—
	Needle winding -	17		17	—
	Clerks, &c. - -	12		12	—
				182	

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* For detailed particulars see page 74 *ante*.

Trades Inquiry.—*continued.*

Description of Trade and Name of Employer.	Department.	No. of Hands Employed.		Total.	Cases of Small-pox.
		M.	F.		
Longford Wire, Iron, and Steel Co. Ld.	Mattress - -	10	12	22	1
	Wire drawing -	27		27	1
	Galvanizing -	6		6	1
	Carriage seat -	6		6	—
	Cleaning - -	6		6	—
	Warehouse - -	8		8	—
	Fitters - -	6		6	—
	Labourers - -	68		68	—
				149	
Artingstall & Co., Ld. (Latchford Brush Works).	Wire weaving -	16		16	—
	Brush - -	5	2	7	—
				23	
W. Silcock & Sons (King Street).	Wire weaving -	21		21	1
Warrington Wire Rope Works (Bewsey Rd.).	Wire weaving -	86		86	—
SOAP BOILING, &C.					
Jos. Crosfield & Sons (Bank Quay).	Soap makers -	300		300	3
GLASS.					
Robinson, Skinner & Co., Ld. (Bank Quay).	Mould making and cleaning.	5	5	10	2
	Warehouse -	—	15	15	1
	—— - - -	125		125	—
				150	
Edward Bolton & Sons (Orford Lane).	Sorting-room -	1		1	1
	Glasshouse -	40		40	—
	Cutting - -	25		25	—
	Warehouse -	3	7	10	—
	Mould room -	3		3	—
	Engraving - -	2		2	—
	Yard, lodge, and office.	11		11	—
				92	
TANNING.					
J. & J. Tinsley (Mersey Street).	- - -	100		100	—
T. W. Nelson & Co., Mersey Street.	- - -	150		150	—
W. Reynolds & Co., Ld., Mersey Street.	- - -	65		65	—
J. T. Cunliffe, Ld., Howley.	- - -	15		15	—
J. H. Fleming & Co., Fennel Street.	- - -	70		70	—
Guest Bros., Wenwick Street.	- - -	25		25	—
A. Waring & Co., Ld., Wenwick Road.	Tanning - -	15		15	—
	Sizing - -	28	12	40	1
				55	
Tanners Lane Tanning Co. Ld.	- - -	50		50	1
Wm. Tinsley & Co., Latchford.	- - -	20		20	1
S. Reynolds, Latchford	- - -	40		40	—
Hy. Parkinson & Co., Latchford	- - -	30		30	—

TRADES INQUIRY.—*continued.*

Description of Trade and Name of Employer.	Department.	No. of Hands Employed. M.	No. of Hands Employed. F.	Total.	Cases of Small-pox.
FILE AND TOOL WORKS.					
Peter Stubs, Ld., Scotland Road.	- - -	193	7	200	2
Thewles and Griffith, Mersey Street.	File - - -	70		70	1
	Tool - - -	100		100	—
				170	
Edelsten and Son, Latchford.	- - -	—	—	70	1
INDIA RUBBER WORKS.					
Castle Rubber Co., Ld., Ellesmere Street, Workshop.	- - -	10	90	100	2
Wharf Street Works -	- - -	120	30	150	—
				250	
CHEMICALS.					
Roberts, Dale, & Co., Mersey Street.	- - -	20	—	20	—
Winser & Co., Bank Quay.	Alum - -	16	—	16	—
	Boiler firing -	2	—	2	—
	Epsom salts -	8	—	8	—
	Glauber salts -	2	—	2	—
	Salufer - -	1	—	1	—
	Cooperage - -	1	—	1	—
				30	
SPELTER AND ZINC.					
Hy. Kenyon & Co., Bank Quay.	- - -	20	—	20	—
				20	
FUSTIAN CUTTING.					
Jas. Platt and Sons -	Workshop. Bostock Street -	1	56	57	5
	Aikin Street -	2	82	84	14
	Bank Street -	1	34	35	—
	Carlisle Street -	1	47	48	—
	Cockhedge - -	5	60	65	—
	Hopwood Street		5	60	—
	Turner Street -	1	43	44	—
	Lythgoes Lane -	10	370	380	8
				773	
Jos. Wilkinson - -	Longford Street -	—	90	90	4
	Eldon Street -	1	45	46	1
	Wakefield Street -	2	98	100	11
				236	
TIMBER AND SAW MILLS.					
R. A. Naylor - -	Joinery - -	42		42	1
	Turnery - -	20		20	1
	Sawyers - -	20		20	—
	Wheelwrights -	6		6	—
	Japanners - -	6		6	—
	Machinists - -	12		12	—
	Smiths - -	5		5	—
	Carters - -	6		6	—
	Labourers - -	19		19	—
				136	

TRADES INQUIRY.—*continued.*

Description of Trade and Name of Employer.	Department.	No. of Hands Employed. M.	No. of Hands Employed. F.	Total.	Cases of Small-pox.
CORN MILLERS.					
Jas. Fairclough and Sons, Mersey Mills.	- - -	76		76	—
Bank Quay Mills -	- - -	21		21	—
Bridgefoot - -	Warehouse -	2		2	—
				99	
ENGINEERING.					
Cheshire Lines Committee (Battersby Lane).	- - -	396		396	—
GAS STOVE MAKERS, &c.					
Fletcher, Russell, & Co., Ld. (Thynne Street).	- - -	200		200	—
Richmond & Co. (Academy Street).	- - -	120		120	2
PRINTING.					
Mackie & Co., Ld., Sankey Street.	- - -	120	80	200	—
BREWING.					
Peter Walker and Son, Dallam Brewery.	Brewing - -	163		163	1
	Yard - -	40		40	—
	Offices - -	18		18	—
	Coopers, &c. -	44		44	2
	Fitters - -	14		14	1
	Bricklayers -	26		26	—
	Joiners - -	15		15	—
	Carters - -	21		21	—
	Bottlers - -	23		23	—
				364	
DRAPERS.					
J. and W. Dutton, Sankey Street.	- - -	30	90	120	1
RAILWAYS.					
Cheshire Lines Committee, Station and Warehouses Central Station.	- - -	129		129	2
London and North-Western Railway Co.	Locomotive -	253		253	9
	Permanent way -	77		77	1
	Traffic - -	150		150	3
	Wagon - -	2		2	1
	Signal - -	41		41	—
	Carriage - -	5		5	—
				528	

Relations of Small-Pox to Social Class.

Social class is a condition somewhat difficult to gauge; but, with a view to show the social class of those persons affected with small-pox, compared with that of the town generally, a statement is here submitted (Table LV*a*.) showing the different rateable values of all the houses in the towns.

In the 38 houses rated at between 8*l.* and 16*l.* are included a good many in the occupation of two or more families. At any rate the whole of this group would be included among those occupied by the great "working class."

It will be seen that all but 11 of the infected houses are estimated to be rated at less than 16*l.* net rental per annum. One of these houses was in the occupation of a clergyman, but all the other 10 were occupied by tradesmen, who used their dwelling-houses as business premises. They were in the occupation of one butcher, one draper, one pawnbroker, three innkeepers, and four model lodging-house keepers,—persons, be it observed, whose callings naturally expose them to sources of direct infection. The disease was introduced into the clergyman's house by his wife taking flowers to the hospital, as mentioned in the Introduction (p. 3).

With these exceptions the small-pox was absolutely confined to the lower, or artisan, or working classes of society, whose gregarious habits pre-eminently favour the spread of the disease from person to person. This is another circumstance against the theory of aërial spread.

Causes of immunity of middle and upper classes.

The great majority, if not all, of the persons, living in 893 houses of 16*l.* and upwards were most certainly exposed to aërial currents from the hospitals. Most of them lived within 500 or 1,000 yards of one or other of the hospitals, why should they escape this supposed influence?

To this it might be answered:—

1. That their habits are more cleanly, which is undoubtedly true.
2. That they are more generally revaccinated. On this point no statistical information is available, but several of the doctors of the town informed me that this was undoubtedly a fact, and my own observations lead me to credit it.

In general terms each of these circumstances is undoubtedly true, and seems to me to aid in the explanation of the immunity of the middle classes from small-pox. But it is an equally indisputable fact that they do not mix so closely together, and it seemed to me that this helps to afford an explanation of the prevalence of small-pox among the lower classes of society in the Warrington outbreak 1892–93.

The question of social class is also referred to on p. 90.

TABLE LV*a*.

Statement of Ratable Values of the 9,630 Inhabited Houses in Warrington 1891, and the Houses Infected with Small-pox, as estimated by Collector of Borough Rates.

—	Houses rated at 8*l.* and under.	Houses rated at more than 8*l.* and less than 16*l.*	Houses rated at 16*l.* and over.
Number of houses of that value in the borough.	6,777	1,960	893
Number of houses infected by small-pox, 455, excluding fever hospitals and workhouse.	406	38	11
Per-centage - - - - -	5·99	1·93	1·23

SECTION III.—HEALTH OF THE POPULATION OF WARRINGTON.

Prevalence of Disease.

The several causes of death during 1891, according to the Registrar-General's returns, are to be found on p. 38 *ante*.

Anœmia.

The large and growing industries in Warrington necessitate of course a great consumption of coal, and the smoke from these factory chimneys hangs perpetually over the town. This blackens the faces of the inhabitants, but I examined many of both sexes on Sundays when they were clean, and was struck by their pallor. This I found on investigation to be due to anæmia, caused, it seemed to me, by the impurity of the atmosphere they habitually breathe.

Measure of Health.

It may be taken that the means of measuring the health of the community by statistics are:—

(1.) The corrected death-rate.
(2.) The zymotic diseases death-rate.
(3.) The infantile death-rate.
(4.) Mean age at death.
(5.) Probable duration of life.
(6.) The expectation of life.

No Life Tables have been constructed to enable one to state particulars of the last three, but the following particulars, relative to the first three points, have been derived from the annual reports of the Medical Officer of Health for the years 1886 to 1892 inclusive.

1.—*Corrected Death-rate.*

The average corrected death-rate for the 10 years ending 1871, was 29·6 per thousand.

For the 10 years ending 1881 it was 23·5 per thousand.

For the five years ending 1886 it was 21·2 per thousand.

During the twelve months ending,—

December 31, 1886, the corrected death-rate was 20·7 per thousand.
December 31, 1887, 23·5 per thousand.
December 31, 1888, 20·6 per thousand.
December 31, 1889, 22·1 per thousand.
December 31, 1890, 22·7 per thousand.
December 31, 1891, 24·6 per thousand.
December 31, 1892, 22·7 per thousand.

It follows from these figures that the average corrected death-rate in the town of Warrington from all causes during these thirty-one years, was 23·12 per thousand of the population per annum. For purposes of comparison, it may be mentioned that in the Town Districts of England and Wales during the 10 years 1861–70 the annual death rate was 24·8, 1871–80 it was 23·1, and 1881–90 it was 20·3.

2.—*Zymotic Disease.*

It will be seen from the tables of deaths and notifications (below) that zymotic diseases of different kinds are very prevalent in the town. Scarlet fever, measles, whooping cough, diphtheria, diarrhœa, and enteric fever are endemic.

Mention has already been made (p. 41) of the prevalence of small-pox, especially in former times.

Typhus Fever.

In 1872 an inquiry was instituted by the Local Government Board, in consequence of the apparently high death-rate from "fever," as exhibited in the quarterly reports of the Registrar-General. Dr. Ballard in his report states that the form of fever which was prevalent, was mainly typhus, epidemics of which disease had previously occurred in 1865, 66, and 67. As in the small-pox epidemic of 1892, the fustian cutters suffered severely. This gentleman attributed the fever to back-to-back, ill-ventilated houses, neglected midden-closets, bad and deficient water supply, and deficient arrangements for dealing with outbreaks of epidemic disease.

In 1881 the zymotic diseases death-rate was 2·0 per 1,000 of the population.
In 1882 the zymotic diseases death-rate was 5·8,
In 1883 the zymotic diseases death-rate was 2·7,
In 1884 the zymotic diseases death-rate was 4·7,
In 1885 the zymotic diseases death-rate was 1·2,
In 1886 the zymotic diseases death-rate was 2·3,
In 1887 the zymotic diseases death-rate was 5·0,
In 1888 the zymotic diseases death-rate was 4·15,
In 1889 the zymotic diseases death-rate was 4·22,
In 1890 the zymotic diseases death-rate was 3·88,
In 1891 the zymotic diseases death-rate was 3·15,
and in 1892 the zymotic diseases death-rate was 3·9 per 1,000 of the population.

The following table (Table LVI.,) shows an analysis of the deaths, and it will be seen that zymotic disease in all forms is a very frequent and fatal visitor to the town of Warrington. In the six years ending 1892, it accounts for no less than 1,226 deaths, or 12·5 per cent. of an average population of 45,000.

TABLE LVI.

Showing Number of Deaths and the Death-rate from the several Zymotic Diseases in Warrington, 1887–1892.

—	Small-pox.		Scarlet Fever.		Measles.		Whooping Cough.		Diphtheria.		Diarrhœa.		Typhus.		Enteric Fever.		Total Deaths from Zymotic Diseases.	Total Death-rate per 1,000 of Population from Zymotic Diseases.
	Number of Deaths.	Death-rate per 1,000 of Population.	Number of Deaths.	Death-rate per 1,000 of Population.	Number of Deaths.	Death-rate per 1,000 of Population.	Number of Deaths.	Death-rate per 1,000 of Population.	Number of Deaths.	Death-rate per 1,000 of Population.	Number of Deaths.	Death-rate per 1,000 of Population.	Number of Deaths.	Death-rate per 1,000 of Population.	Number of Deaths.	Death-rate per 1,000 of Population.		
1887. (Population 47,264.)	0	0	1	·02	134	2·83	46	0·97	4	0·08	48	1·01	1	0·2	6	0·12	240	5·08
1888. (Population 47,464.)	2	0·04	77	1·62	1	·02	58	1·22	5	0·10	43	0·90	1	0·2	9	0·19	*197	4·15
1889. (Population 49,000.)	0	0	32	0·65	91	1·85	32	6·65	8	0·16	36	0·73	0	0	8	0·16	207	4·22
1890. (Population 50,000.)	0	0	16	0·32	33	0·66	56	1·12	17	0·34	57	1·14	0	0	15	0·30	194	3·88
1891. (Population 53,000.)	0	0	9	0·18	80	1·4	19	0·36	11	0·20	41	0·77	0	0	14	0·26	174	3·30
1892. (Population 54,084.)	55	1·01	66	1·22	13	0·24	37	0·68	7	0·13	26	0·48	0	0	11	0·20	214	3·9

* In 1888 there was one death from relapsing fever.

3.—*Infantile Mortality.*

In Tables LVIII. and LIX. given below are to be found particulars of the infant mortality for the different years based on the details given in the annual reports of the Medical Officer of Health, and it will be seen that the infant mortality is high in the town of Warrington.

TABLE LVII.

INFANTILE MORTALITY IN WARRINGTON, 1880–1892.

—	Number of Deaths under 1 year of Age.	Proportion to 1,000 Births Registered.	Number of Deaths under 5 years.	Per-centage of Deaths under 5 years to Deaths at all Ages.
Average of 5 years, 1880–1884.	—	152	—	51·4
1885.	243	132	—	41·8
1886. (Population, 46,343.)	293	158	464	47·2
1887. (Population, 47,264.)	317	170	584	52·0
1888. (Population, 47,464.)	277	147	495	49·0
1889. (Population, 49,000.)	318	163	570	52·6
1890. (Population, 50,000.)	351	171	583	51·5
1891. (Population, 53,000.)	350	155	595	44·4
1892. (Population, 54,084.)	341	157	608	49·4

SECTION IV.—HABITS AND GENERAL CONDITIONS OF THE INHABITANTS.

Floating Population.

The majority of the people of Warrington are of fairly settled habits, and the usually thriving state of the industries affords them settled occupation.

But owing to its position on the high road to and from Manchester, Liverpool, and Birmingham, there is a considerable floating population. The returning officer states that there are annually between seven and eight thousand changes of address either to different parts of Warrington or to and from other towns.

The important part played by the common lodging-houses may be gathered from the facts previously narrated, and it will be seen that the very origin of the epidemic was a case arising in the floating population.

The ship canal works, which are about a mile from the town, largely supply the occupants of the common lodging-houses, and it was in one of these labourers in whom Case I. occurred.

Those among the inhabitants who are of more fixed abode are in the habit of passing in and out of each other's houses, instances of infection from which have been mentioned.

The children play together in the streets or in the open spaces, the so-called "fields" to which reference has so frequently been made, and all these circumstances combine to favour the propagation of the disease; indeed, it would seem from an examination of all the foregoing facts that the disease does but follow here, as it does elsewhere, the lines of human contact and intercourse.

Day of Week for the Eruption of Small-pox.

In some epidemics it has been shown that Sunday was the favourite day of the week for the development of the eruption, and therefore presumably Sunday (14 days before) was the day of infection; the following particulars show the relative number of cases who developed the eruption on each day of the week in the Warrington epidemic 1892–93.

119	cases developed the eruption on a	Wednesday.
102	,, ,, ,, ,,	Sunday.
93	,, ,, ,, ,,	Tuesday.
91	,, ,, ,, ,,	Saturday.
91	,, ,, ,, ,,	Thursday.
87	,, ,, ,, ,,	Friday.
84	,, ,, ,, ,,	Monday.

No explanation can be offered why Wednesday takes a slight lead. Sunday is not far behind, and there is not a very large difference between any.

Fêtes and festivals may have played an important part in the propagation of the disease, and a good many people attributed their infection with more or less reason to a fête known as "Walking Day" when all the school children parade the streets, and their parents flock to see them, or to a fire which occurred in Bewsey Street.

Intelligence.

The intelligence of these people seemed to me to be distinctly below the average of the present day, and certainly it is hard to imagine people more ignorant of the primary rules of health and cleanliness than those amongst whom I conducted my inquiries.

A considerable proportion of the adults could neither read nor write, nor even spell their own names correctly, circumstances which have sometimes given rise to difficulty. But the fact which struck me most was their almost invariable practice of sitting down to meals without washing the dirt of their occupation off their hands or faces.

Instances of ignorance as regards infection were numerous. The Medical Officer of Health informed me that in the early part of November 1892, the father of a family developed the rash of small-pox, and was about to be removed to the hospital, so his wife sent to fetch the children from school in order that they might say good-bye to their father.

In another instance the Medical Officer of Health found several women in the bedroom of a patient known to have small-pox, holding a farewell tea-party.

An enquiry was held on November 5th on the body of a child of eight, who died November 3rd, and it was elicited that the child had been ill for a week, whilst the mother and father were "on the drink," and the verdict was "that death was due to small-pox accelerated by neglect."

It seemed to me as I went from house to house, day after day, amongst this population, that it would be somewhat irrational to consult some of these folk on the propriety of their disinfection, isolation, and vaccination, if these means were decided to be necessary for their protection from small-pox on scientific grounds.

Intemperance.

Not many instances of immorality came to my notice, but intemperance is very rife amongst all classes. Large quantities of alcohol are consumed in the public-houses, inns, and little beer-shops, one or more of which could be found in nearly every street in the town. According to the report of the chief constable of the town for the year ending 29th December 1892, (p. 13), there were in that year—

88 licensed victuallers,
48 beer-house keepers, and
73 off-license holders.

There were 680 charges of drunkenness during that year. This was nearly 100 below the average of preceding ten years. 424 males were convicted, and 50 were discharged, 149 females were convicted and 57 discharged.

The Irish nationality formed a numerous contingent in the town and contributed very largely to the small-pox cases.

Wages.

The wages earned by labourers amount to 18*s.* or 20*s.* a week; a skilled artizan would earn from 25*s.* to 40*s.* a week and upwards, varying from week to week, because the greater part of the work is piece-work. There did not seem to me to be an undue proportion of want or destitution amongst the lower classes, and if it were not for the large sums of money spent in drink, they would be, so far as I could judge, affluent people.

The question of social class is also referred to on p. 87.

SECTION V.—SEWERAGE AND DISPOSAL OF REFUSE.

Sub-section *a*.—Liquid Refuse and Sewers.

Nothing in this inquiry led me even to suspect that the disposal of refuse had any influence whatever on the propagation of small-pox.

Warrington was one of the earliest towns to adopt the pail-closet system in place of the middens, which formerly, when typhus was so prevalent, existed.

By reason of its flatness and the lowness of its elevation, Warrington is badly situated for a proper arrangement of sewers.

Its altitude varies only between 23 feet (approximate mean water at Liverpool in Mersey Street beside the river) and 50 feet in the higher N.E. corner of the town, a distance of about one mile.

Nevertheless, nearly all the streets are sewered for the purpose of conveying surface water, slops, and waste. The fall of these varies from about 1 in 100 to 1 in 1,000. There are two outfalls in the Mersey and *one* into the Sankey Brook; the two former are tide-locked. The Bank Quay out-fall, the main one, is only 6 feet above ordinary low-water mark. The rise and fall of the tide is normally 16 ft. and the outlet is completely tide-locked for about 2½ hours under ordinary circumstances. Flood tides rise 25 feet, almost to the level of Mersey Street.

It is reckoned that there are only 400 water-closets in the town, the rest of the houses having pail-closets, consequently this system of sewage is not so objectionable as it otherwise might be.

Sub-section *b*.—The Disposal of Excreta.

There are about 9,000 houses dependent upon the pail system for the disposal of solid and fluid excreta.

The pails which contain nothing more than excreta are taken through the back yards of the houses once a week and carted to the intercepting depôt in the town, there to be emptied, disinfected, and cleansed. The excreta are then forced through pipes to a distance of about half-a-mile by pneumatic pressure from a Shone pump, to the Longford works outside the town; where they are evaporated and made into *poudrette* by means of heat generated chiefly from the ashes and the refuse of the town.

Theoretically it is a very perfect principle, and in practice I was informed that, if it were not for the distance, it could almost be made to pay its own working.

It is a point worthy of note that in the worst part of the town where, as in Morris's Yard, Knowles' Yard, &c. &c., small-pox was rife, privies, used in common are placed a little way from the houses, in a place accessible to several adjacent houses where they exercise little or no effect upon the health of the inmates.

Sub-section *c*.—Removal of Ashes and other solid Refuse.

This is also effected in pails, entirely separate from the excreta; these pails are emptied into carts in the street and the refuse carted direct to the Longford depôt, there to be burnt in furnaces which generate the steam for the evaporation of the manure.

These pails also are removed once a week, and the whole of this, and of the carting of the excreta is done during the day-time.

It might be thought that such a means of disposal of excreta and ashes lent itself to the propagation of small-pox, and therefore I very carefully enquired for any cases amongst the 75 men employed in this work who come into contact more or less with the excreta and refuse, and who some of them were in the constant practice of going in and out of the infected houses.

Of these only one was attacked by the disease, and he had been for a few weeks preceding his attack, temporarily employed on ambulance work removing cases of small-pox, and clothes for disinfecting.

This circumstance alone seems to negative any idea that small-pox is propagated by means of the pail system.

SECTION VI.—WATER AND FOOD SUPPLY.

SUB-SECTION *a.*—WATER SUPPLY.

Warrington was in great trouble for many years by reason of the bad quality and small quantity of its water, and it is only recently that by borings at Winwick a system of waterworks has been provided for the town.

The water supply was not specially investigated, but as far as my inquiries went, there was not the faintest reason to trace any connexion between small-pox and the water supply of the town.

The main supply is derived from Winwick, a northern suburb about two miles away, where the water is pumped from an artesian well in the red sandstone.

There is also a supply derived from the south of the town, surface water being collected, but I was informed by the borough surveyor that it was used solely for manufacturing purposes.

SUB-SECTION *b.*—THE MILK SUPPLY.

No facts came under my notice which at all suggested the influence of the milk supply in the spread of the disease.

SUB-SECTION *c.*—FOOD SUPPLY.

Nor was the food supply, so far as I could ascertain, an unusually important factor in the spread, apart from the personal contact of the persons conveying the food in the manner mentioned in the foregoing portions of the report.

SECTION VII.—THE WEATHER.

The latter part of 1892 was rather inclined to be wet and also to be cold, but otherwise there was nothing abnormal about the year 1892.

The winter of 1892–3 has generally been regarded as a cold one; and there were a good many days on which the thermometer in exposed places reached freezing point, and especially between December 26th, 1892, and January 7th, 1893.

The following table of records, carefully taken by the Medical Officer of Health at the Aikin Street Observatory, which is within the hospital grounds, and supplied to me by the courtesy of that gentleman, gives full particulars of the meteorology of the town between July 1st, 1892, and March 31st, 1893.

I have made a careful study of these records, but have failed to note any practical connexion between the state of the weather and the small-pox epidemic in Warrington in 1892, and I am inclined to respectfully endorse the remarks of that careful observer, Dr. Thomas Percival, which he made in 1789, but which seem to me as true to-day as they were 100 years ago:—"No "one can doubt that variations in the heat, moisture, "dryness, temperature, and other qualities of the air, "must influence a disease, which is always of an "inflammatory, and often in the last stages of a "putrid nature. But the progress of it cannot be "regulated by the seasons, because it is derived from "contagion: the communication of which frequently "depends upon accident, is confined to no period of "time, and is varied by its degree of malignancy. "During the last visitation of small-pox at Warrington, "the state of the atmosphere went through all possible "changes, but with no perceptible difference in the "circumstances of the disease."

TABLE LVIII.

Giving Meteorological Records of the Town of Warrington, from July 1, 1892, to March 31, 1893. made at the Aikin Street Hospital under the supervision of Mr. John H. Gornall, Medical Officer of Health.

Date.		Hygrometer.		Temperature.		Rain.	Wind.		Weather.		Remarks.
		Dry Bulb.	Wet Bulb.	Max.	Min.		Directions.	Anemometer. Total in Day.	At 9 am.	In previous 24 hours.	
						Inches.		Miles			
1892, July	1	59	56	66	44		N.W.	165	F.	Fine.	
,,	2	59	55	71	54		S.W.	100	F.	,,	
,,	3	60	54	75	56	·50	S.W.	80	F.	Stormy.	
,,	4	56	52	64	53	·10	S.W.	100	C.	Fine.	
,,	5	58	56	64	50	·06	S.W.	200	C.	,,	
,,	6	55	52	62	48	·40	S.W.	100	C.	Cloudy.	
,,	7	59	55	63	54	·06	S.W.	220	C.	,,	
,,	8	55	50	65	49	·05	S.W.	370	C.	Fine.	
,,	9	55	52	61	49	·10	S.W.	100	F.	Cloudy.	
,,	10	56	54	65	52		N.W.	620	C.	,,	
,,	11	54	51	68	46		N.E.	200	F.	Fine.	
,,	12	56	55	62	47		N.E.	200	F.	,,	
,,	13	52	49	62	49		N.E.	100	F.	,,	
,,	14	55	52	61	51		S.E.	50	C.	,,	
,,	15	54	50	65	50	·50	S.E.	230	C.	Cloudy.	
,,	16	52	51	56	51	·22	S.E.	100	C.	,,	
,,	17	54	50	56	49		E.	330	F.	Fine.	
,,	18	49	47	59	45		N.E.	100	F.	Cloudy.	
,,	19	53	51	56	46	·65	N.W.	195	C.	Stormy.	
,,	20	53	50	63	50		N.E.	395	F.	Cloudy.	
,,	21	56	53	65	51		N.E.	175	C.	Fine.	
,,	22	55	54	66	45		N.E.	180	C.	,,	
,,	23	56	55	66	51		N.	125	F.	,,	
,,	24	59	55	73	51		E.	100	F.	,,	
,,	25	52	50	71	46		S.E.	70	F.	,,	
,,	26	52	50	62	48		S.E.	100	C.	,,	
,,	27	52	50	68	49		S.E.	60	F.	,,	
,,	28	54	51	69	44		N.E.	100	F.	,,	
,,	29	55	51	67	46		S.E.	75	F.	,,	
,,	30	56	52	65	44		S.E.	100	F.	,,	
,,	31	58	56	62	46	·06	S.E.	30	C.	Stormy.	
1892, August	1	59	57	64	56		N.E.	780	C.	Cloudy.	
,,	2	55	53	64	50	·04	N.E.	100	C.	Fine.	
,,	3	58	56	66	54	·04	N.W.	125	C.	Cloudy.	
,,	4	54	50	61	49	·02	N.E.	100	F.	,,	
,,	5	50	52	64	49		N.W.	100	C.	Fine.	
,,	6	56	54	65	52		S.W.	340	F.	,,	
,,	7	55	51	63	46	·55	S.E.	300	F.	,,	
,,	8	57	56	64	53	·40	S.W.	125	C.	Cloudy.	
,,	9	54	49	62	51	·04	N.E.	100	F.	Fine.	
,,	10	37	37	62	35		S.E.	115	F.	,,	
,,	11	46	46	68	37		N.E.	100	F.	,,	
,,	12	59	55	71	45	·08	S.E.	150	F.	,,	
,,	13	57	55	66	54	·30	S.W.	100	C.	Cloudy.	
,,	14	62	57	67	55	·05	S.W.	475	F.	Fine.	
,,	15	59	55	68	54		S.W.	100	F.	,,	
,,	16	56	54	65	52		S.	200	F.	,,	
,,	17	61	60	69	55		S.E.	115	F.	,,	
,,	18	57	55	65	54		S.E.	100	F.	,,	
,,	19	56	54	68	51		S.E.	115	F.	,,	
,,	20	52	51	73	45		S.E.	100	F.	,,	
,,	21	62	59	75	51		S.E.	530	F.	,,	

TABLE LVIII.—*continued.*

Date.	Hygrometer.		Temperature.		Rain.	Wind.		Weather.		Remarks.
	Dry Bulb.	Wet Bulb.	Max.	Min.		Direction.	Anemometer. Total in Day.	At 9 am.	In previous 24 hours.	
					Inches.		Miles.			
1892, August 22	63	62	75	61		S.E.	100	F.	Fine.	
„ 23	59	55	74	53	·20	S.E.	200	F.	Cloudy - -	Thunder.
„ 24	58	56	72	56		S.E.	100	F.	Fine.	
„ 25	60	54	67	52	·06	S.E.	200	F.	„	
„ 26	59	55	63	52		N.W.	135	F.	„	
„ 27	52	51	63	49	·12	S.W.	50	F.	„	
„ 28	52	51	64	49	·04	S.W.	55	F.	„	
„ 29	52	50	66	47	·85	S.E.	70	C.	„	
„ 30	60	56	66	51	·20	S.E.	100	C.	Cloudy.	
„ 31	57	55	59	54	·14	S.W.	100	C.	„	
1892, September 1	53	50	66	49	·15	S.W.	100	C.	„	
„ 2	54	52	63	51	·24	S.W.	125	C.	„	
„ 3	50	49	64	50	·24	W.	200	C.	„	
„ 4	63	62	57	46	·02	N.W.	225	F.	Fine.	
„ 5	50	46	59	42		N.W.	340	F.	„	
„ 6	52	48	62	49	·24	N.W.	100	F.	„	
„ 7	55	52	59	51	·06	S.W.	100	C.	Cloudy.	
„ 8	49	48	62	44	·02	N.E.	95	F.	Fine.	
„ 9	49	48	59	42	·07	E.	100	C.	„	
„ 10	57	56	63	46	·09	S.E.	100	C.	„	
„ 11	55	53	63	50	·20	S.E.	545	C.	Cloudy.	
„ 12	56	55	66	52	·04	S.W.	100	F.	Fine.	
„ 13	60	57	65	55	·10	S.W.	105	F.	„	
„ 14	50	49	63	45		N.W.	100	F.	„	
„ 15	54	50	60	49	·02	S.W.	50	C.	„	
„ 16	52	50	59	50	·02	S.W.	55	C.	„	
„ 17	47	45	60	41		S.W.	100	F.	„	
„ 18	48	46	64	40	·12	S.W.	100	F.	„	
„ 19	59	57	63	46	·08	S.W.	95	F.	Cloudy.	
„ 20	55	54	59	52	·65	S.W.	200	F.	„	
„ 21	50	48	54	48	·10	S.E.	100	C.	„	
„ 22	50	46	64	46		S.E.	25	C.	„	
„ 23	52	50	63	48	·18	S.E.	100	C.	Fine.	
„ 24	54	52	59	51		S.W.	200	C.	„	
„ 25	54	51	63	45		N.W.	400	F.	„	
„ 26	54	51	64	47	·06	S.W.	200	F.	„	
„ 27	59	54	62	53	·38	S.W.	265	C.	Cloudy.	
„ 28	46	45	55	45	·50	S.W.	200	C.	Stormy.	
„ 29	44	42	56	41	·14	S.W.	200	C.	Cloudy.	
„ 30	42	41	55	41		S.W.	100	C.	„	
892, October 1	44	42	55	40	·50	S.W.	200	C.	„	
„ 2	43	41	56	40	·06	S.W.	265	C.	„	
„ 3	47	46	51	41	·48	S.W.	100	C.	„	
„ 4	45	44	53	41	·06	S.W.	200	C.	„	
„ 5	40	39	51	37	·09	S.W.	100	C.	„	
„ 6	46	45	54	38	·19	S.W.	125	C.	„	
„ 7	45	44	51	42	·45	S.W.	200	C.	„	
„ 8	45	44	50	44	·24	N.W.	100	C.	„	
„ 9	50	48	51	44	·40	N.W.	50	C.	„	
„ 10	47	46	53	45	·14	N.W.	200	C.	„	
„ 11	40	39	52	39	·06	S.W.	100	C.	„	
„ 12	41	39	51	36		N.E.	125	F.	Fine.	
„ 13	46	44	54	40	·08	N.E.	100	C.	Cloudy.	
„ 14	54	51	54	44	·32	N.E.	100	C.	„	

TABLE LVIII.—*continued.*

Date.		Hygrometer.		Temperature.		Rain.	Wind.		Weather.		Remarks.
		Dry Bulb.	Wet Bulb.	Max.	Min.		Direction.	Anemometer. Total in Day.	At 9 a.m.	In previous 24 Hours.	
						Inches.		Miles.			
1892, October	15	45	47	52	47	·35	N.E.	200	C.	Cloudy.	
„	16	43	39	48	39	·02	N.	50	C.	„	
„	17	36	35	49	34		N.	90	C.	Fine.	
„	18	33	33	49	30		N.	125	F.	„	
„	19	33	33	49	30		N.	400	F.	Cloudy.	
„	20	42	40	51	31	·42	N.E.	100	F.	„	
„	21	44	42	46	40	·06	N.E.	200	C.	„	
„	22	36	34	44	34	·08	N.E.	100	F.	„	
„	23	41	40	46	33	·24	N.	175	C.	„	
„	24	37	36	44	36		N.	200	C.	„	
„	25	31	31	42	26		N.	200	F.	Fine.	
„	26	26	26	45	23	·15	N.	125	F.	Cloudy.	
„	27	46	42	57	24	·09	N.E.	100	F.	„	
„	28	55	52	64	39	·04	S.W.	200	C.	Fine.	
„	29	55	54	59	51	·02	S.W.	300	C.	Cloudy.	
„	30	36	35	53	35		E.	35	F.	Fine.	
„	31	34	34	49	30		N.E.	75	F.	Foggy.	
1892, November	1	30	30	38	26		S.E.	100	F.	„	
„	2	34	34	46	25	·10	S.E.	100	F.	„	
„	3	45	44	55	32		S.W.	200	F.	„	
„	4	53	50	56	44	·15	S.W.	60	C.	Cloudy.	
„	5	50	49	57	47	·14	S.W.	100	C.	„	
„	6	46	45	50	42	·09	S.W.	25	C.	„	
„	7	41	40	45	36	·02	S.W.	108	C.	„	
„	8	39	38	49	35		S.W.	25	C.	Fine.	
„	9	44	42	52	38	·05	S.W.	100	F.	Cloudy.	
„	10	46	45	52	42		S.W.	100	C.	„	
„	11	45	45	54	44		S.	25	C.	„	
„	12	44	42	52	42	·12	S.E.	100	C.	„	
„	13	51	49	54	42	·20	S.E.	75	C.	„	
„	14	53	51	57	45		S.W.	25	C.	„	
„	15	49	47	52	48		S.E.	75	C.	Foggy.	
„	16	45	45	46	45		S.W.	25	F.	„	
„	17	37	36	39	36		N.E.	70	C.	„	
„	18	35	35	44	32		S.W.	100	C.	Cloudy.	
„	19	43	41	45	34	·32	S.E.	25	C.	„	
„	20	45	44	47	42		S.E.	70	F.	Fine.	
„	21	39	39	49	35		S.E.	25	F.	„	
„	22	42	40	45	38		S.E.	25	C.	Cloudy.	
„	23	43	41	45	38		S.E.	25	F.	Fine.	
„	24	41	40	44	40		S.E.	15	C.	Cloudy	
„	25	41	38	45	40	·12	S.E.	50	F.	Fine.	
„	26	45	43	49	40	·30	S.W.	15	C.	Cloudy.	
„	27	42	42	50	40		S.W.	95	F.	Fine.	
„	28	46	45	54	42	·08	S.W.	50	C.	Cloudy.	
„	29	46	43	48	45	·12	S.W.	25	C.	„	
„	30	39	35	45	35	·05	S.W.	25	C.	„	
1892, December	1	40	39	47	39		S.W.	160	C.	Cloudy.	
„	2	27	27	37	26	·10	N.W.	50	F.	Foggy.	
„	3	37	36	45	25	·15	S.W.	75	C.	Cloudy.	
„	4	33	32	36	31	·12	N.W.	200	C.	„	Snow.
„	5	32	32	39	25	·30	N.W.	205	C.	„	Snow Storm.
„	6	36	35	40	22	·18	S.W	665	C.	„	
„	7	32	32	38	30		N.E.	125	F.	Fine.	
„	8	28	28	37	24	·25	N.E.	50	C.	Snow.	

TABLE LVIII.—*continued.*

Date.		Hygrometer.		Temperature.		Rain.	Wind.		Weather.		Remarks.
		Dry Bulb.	Wet Bulb.	Max.	Min.		Direction.	Anemometer. Total in Day.	At 9 a.m.	In previous 24 Hours.	
						Inches.		Miles.			
1892 December	9	37	35	37	27		N.E.	90	C.	Snow.	
„	10	28	28	41	25	·20	S.W.	75	C.	Cloudy.	
„	11	39	39	45	25	·10	N.W.	265	C.	„	
„	12	41	40	45	37	·15	W.	355	C.	„	
„	13	35	34	47	34	·10	S.W.	150	C.	„	
„	14	47	46	52	33	·04	S.E.	50	C.	„	
„	15	45	45	53	43		S.E.	50	F.	Fine.	
„	16	35	35	50	31	·02	S.W.	150	C.	Cloudy.	
„	17	49	49	54	34		S.E.	310	C.	„	
„	18	50	50	54	46		N.E.	230	F.	Fine.	
„	19	46	46	49	46		S.E.	250	F.	„	
„	20	44	43	47	42		S.E.	50	F.	„	
„	21	44	42	46	41		S.E.	30	F.	„	
„	22	37	37	44	34		N.E.	50	F.	„	
„	23	36	36	39	30		N.E.	90	C.	Cloudy.	
„	24	31	31	34	30		S.E.	150	F.	Fine.	
„	25	27	26	31	24		S.E.	100	F.	„	
„	26	13	13	32	16		N.E.	60	F.	„	
„	27	16	16	30	12		S.E.	10	F.	„	
„	28	15	15	31	12		S.E.	20	F.	Foggy.	
„	29	26	26	32	13		N.E.	10	F.	„	
„	30	25	25	35	18		N.E.	20	F.	„	
„	31	35	35	31	24		N.E.	100	F.	„	
1893, January	1	22	27	31	25		N.E.	30	F.	Fine.	
„	2	25	25	34	19		N.E.	50	C.	Cloudy.	
„	3	35	35	34	20		S.E.	20	C.	„	
„	4	19	19	22	14		E.	50	F.	Foggy.	
„	5	19	18	31	9		E.	110	F.	„	
„	6	29	29	34	17		S.E.	20	C.	Cloudy.	
„	7	31	31	37	28		S.E.	100	C.	„	
„	8	35	35	37	29	·12	S.E.	100	C.	„	
„	9	37	36	37	32		S.E.	75	C.	„	
„	10	35	35	39	31		N.	100	C.	„	
„	11	35	35	38	29		N.	300	F.	Fine.	
„	12	35	35	38	32		N.E.	25	F.	„	
„	13	35	35	41	32	·10	N.W.	105	F.	„	
„	14	35	35	35	30		S.E.	300	F.	„	
„	15	30	30	37	28		S.W.	480	F.	„	
„	16	35	35	41	27	·40	S.W.	50	C.	Cloudy.	
„	17	35	35	44	33	·12	S.E.	100	C.	„	
„	18	44	44	47	34		N.W.	330	C.	„	
„	19	41	40	46	34	·40	S.E.	100	C.	„	
„	20	37	37	43	32	·50	S.W.	130	F.	Finc.	
„	21	40	40	44	36	·04	N.W.	125	F.	„	
„	22	43	43	46	30	·20	N.W.	100	C.	Cloudy.	
„	23	45	45	49	32	·20	N.W.	175	C.	„	
„	24	45	45	52	44		N.W.	225	F.	Fine.	
„	25	40	39	50	37		S.W.	475	F.	„	
„	26	46	44	47	35	·15	S.W.	450	C.	Cloudy.	
„	27	36	35	46	31		S.W.	275	F.	Fine.	
„	28	38	36	57	34	·10	S.E.	200	F.	„	
„	29	46	45	50	36		S.E.	150	C.	Cloudy.	
„	30	46	44	52	40	·40	S.W.	250	F.	Fine.	
„	31	49	45	52	45	·12	S.W.	75	F.	„	

TABLE LVIII.—*continued.*

Date.	Hygrometer.		Temperature.		Rain.	Wind.		Weather.		Remarks.
	Dry Bulb.	Wet Bulb.	Max.	Min.		Direction.	Anemometer. Total in Day.	At 9 a.m.	In previous 24 hours	
					Inches.		Miles.			
1893, February 1	37	36	46	45	·20	N.	135	C.	Cloudy.	
„ 2	41	40	44	35	·18	N.W.	200	C.	„	
„ 3	43	42	51	40		N.E.	125	F.	Fine.	
„ 4	45	44	47	41		S.W.	100	F.	„	
„ 5	35	33	40	32		S.W.	50	F.	„	
„ 6	33	32	48	30		S.E.	75	F.	„	
„ 7	45	43	51	32	·5	S.E.	100	F.	„	
„ 8	42	40	45	40	·2	W.	85	F.	„	
„ 9	44	42	47	38	·22	N.W.	25	C.	Cloudy.	
„ 10	47	45	51	40	·10	N.W.	750	C.	„	
„ 11	45	41	45	43	·15	N.W.	450	F.	Fine.	
„ 12	37	36	42	35	·5	N.W.	650	C.	Cloudy.	
„ 13	36	35	48	34	·30	S.W.	570	C.	„	
„ 14	47	46	53	35	·5	S.W.	80	C.	„	
„ 15	43	41	51	35	·4	S.W.	100	C.	„	
„ 16	47	45	49	42	·20	S.W.	175	C.	„	
„ 17	36	35	51	34	·10	S.W.	150	F.	Fine.	Thunder and lightning.
„ 18	51	49	54	35	·4	S.W.	100	F.	„	
„ 19	51	49	48	46	·2	S.W.	50	C.	Cloudy.	
„ 20	40	39	49	38	·2	S.W.	25	F.	Fine.	
„ 21	40	37	42	37	·5	S.W.	150	F.	„	
„ 22	40	37	40	37	·4	N.E.	75	C.	Cloudy.	
„ 23	35	34	39	34		N.E.	100	F.	Fine.	
„ 24	31	31	34	29		N.W.	460	F.	„	
„ 25	32	32	39	29	·35	N.W.	150	C.	Snow.	Snow.
„ 26	39	37	42	29	·12	S.E.	200	C.	Cloudy.	
„ 27	36	34	42	32		S.E.	205	F.	Fine.	
„ 28	27	27	42	25			50	C.	Cloudy.	
1893, March 1	27	27	54	25	·12	S.E.	5	F.	Fine.	
„ 2	48	46	53	37	·10	N.W.	0	C.	„	
„ 3	42	40	50	40	·08	S.E.	100	C.	Cloudy.	
„ 4	48	47	51	40	·04	N.W.	300	C.	„	
„ 5	49	48	52	44		S.W.	440	C.	„	
„ 6	45	44	49	43	·04	S.W.	100	C.	Fine.	
„ 7	45	44	50	39	·02	S.W.	260	C.	„	
„ 8	40	39	51	40		N.W.	125	C.	„	
„ 9	44	42	51	40		S.W.	100	C.	„	
„ 10	42	40	45	40		N.W.	400	F.	„	
„ 11	39	38	56	37		S.W.	200	F.	„	
„ 12	40	36	67	30		S.E.	300	F.	„	
„ 13	46	45	52	39		S.W.	208	F.	„	
„ 14	42	41	51	39		S.W.	100	F.	„	
„ 15	47	46	53	41	·09	S.W.	25	F.	Cloudy.	
„ 16	42	41	45	40		S.W.	100	C.	„	Hail and snow.
„ 17	34	35	43	34	·06	N.W.	250	C.	„	Ditto.
„ 18	35	32	42	30		N.W.	770	F.	Fine.	
„ 19	31	29	48	24		E.	130	F.	„	
„ 20	37	36	52	30		N.E.	100	F.	„	
„ 21	35	34	62	30		S.E.	100	F.	„	
„ 22	35	35	61	33		N.E.	200	F.	„	
„ 23	40	39	65	32		E.	25	F.	„	
„ 24	36	35	66	34		S.E.	100	F.	„	
„ 25	52	50	66	35		S.E.	60	F.	„	
„ 26	38	37	64	31		S.E.	25	F.	„	
„ 27	45	45	54	36		S.E.	100	F.	„	

TABLE LVIII.—*continued.*

Date.		Hygrometer.		Temperature.		Rain.	Wind.		Weather.		Remarks.
		Dry Bulb.	Wet Bulb.	Max.	Min.		Direction.	Anemometer. Total in Day	At 9 a.m.	In previous 24 hours.	
						Inches.		Miles.			
1893, March	28	38	37	62	34		S.E.	60	F.	Fine.	
„	29	34	34	65	32		N.E.	100	F.	„	
„	30	42	42	61	33		S.E.	55	F.	„	
„	31	45	44	65	39		S.W.	25	F.	„	

TABLE LIX.

(Referred to on p. 22 *ante.*)

Showing the number of Houses in which one, and more than one case, respectively, arose.

	318	houses in which 1 case of small-pox arose - - -	= 318 cases.
	75	houses in which 2 cases of small-pox arose - - -	= 150 cases.
	31	houses in which 3 cases of small-pox arose - - -	= 93 cases.
	8	houses in which 4 cases of small-pox arose - - -	= 32 cases.
	5	houses in which 5 cases of small-pox arose - - -	= 25 cases.
	20	houses in which the vaccinated condition of the other inmates was not obtainable (see page 22 *ante*) - - - - -	= 49 cases.
Totals	457	houses containing - - - - - - - -	667 cases.

THOMAS D. SAVILL, M.D. Lond., D.P.H. Camb.

February, 1894.

To face page 38.

THE BOROU

FROM THE

BY T. LON

Corre

Explanation

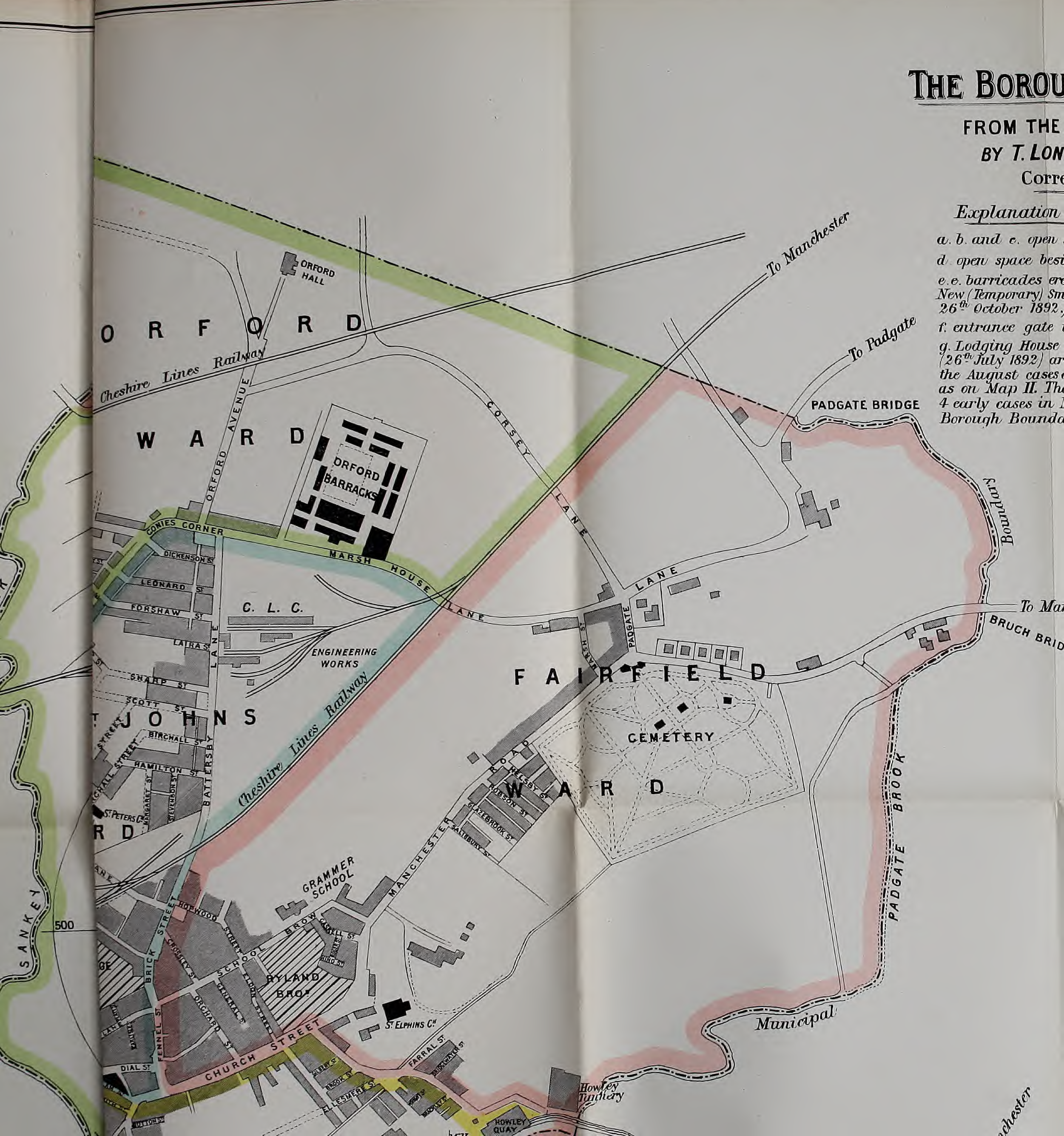
a. b. and c. open

d. open space besi

e. e. barricades ere
New (Temporary) Sm
26th October 1892,

f. entrance gate

g. Lodging House
(26th July 1892) ar
the August cases
as on Map II. Th
4 early cases in
Borough Bounda



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MAP II

THE BOROUGH OF WARRINGTON.

Showing the houses where one or more patients developed the eruption of Small-pox between the 25th July and the 31st August 1892.

Explanation of certain letters on this Map.

a, b, and c .... open spaces beside Old Fever Hospital.

d .... open space beside New (Temporary) Small-pox Hospital.

6114 7.94

MAP III.

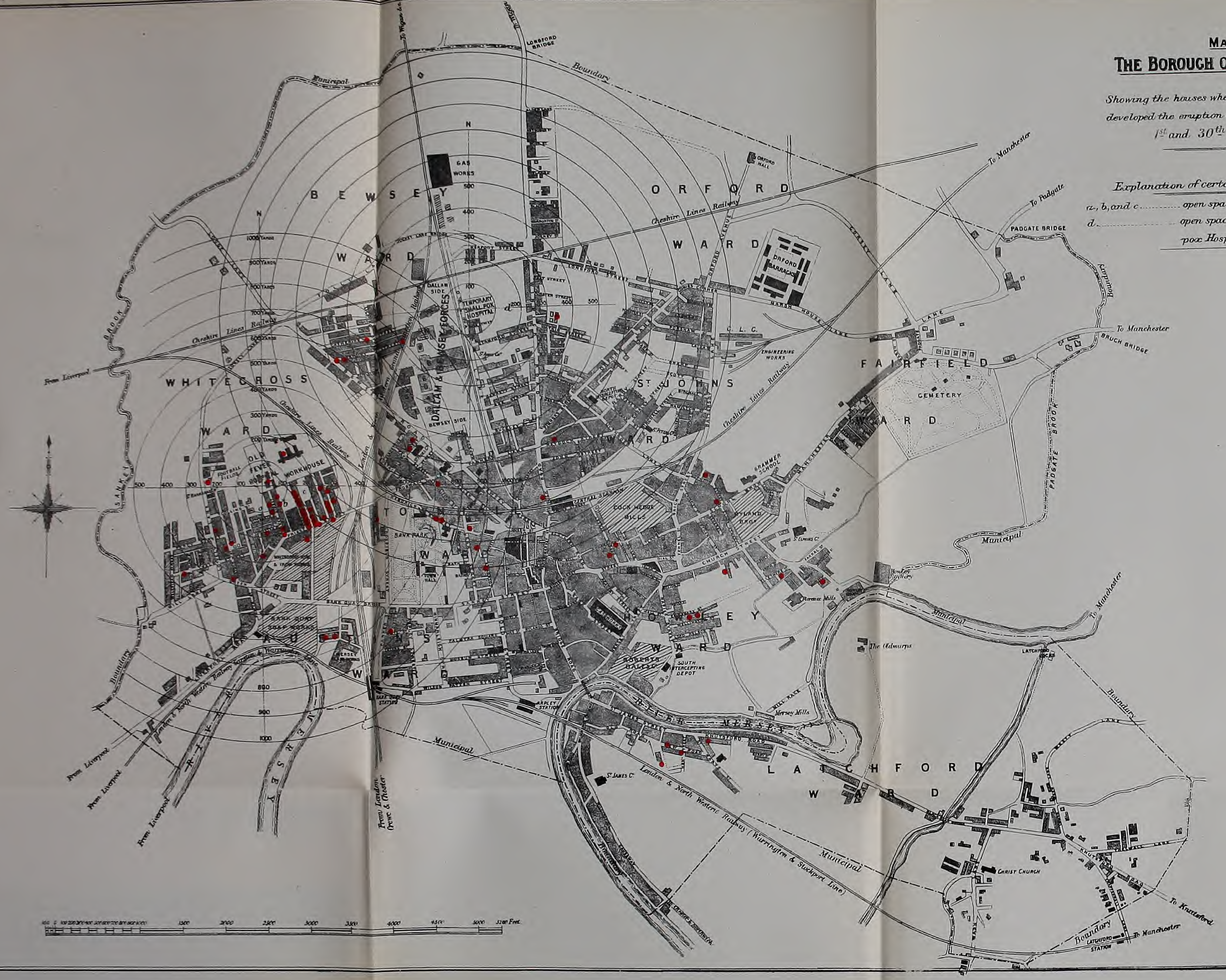
THE BOROUGH OF WARRINGTON.

Showing the houses where one or more patients developed the eruption of Small-pox between the 1st and 30th September 1892.

Explanation of certain letters on this Map.

a, b, and c .... open spaces beside Old Fever Hospital.

d .... open space beside New (Temporary) Small-pox Hospital.



MAP IV.

THE BOROUGH OF WARRINGTON.

Showing the houses where one or more patients developed the eruption of Small-pox between the 1st and 31st October 1892.

Explanation of certain letters on this Map.

a, b, and c .... *open spaces beside Old Fever Hospital.*
d .... *open space beside New (Temporary) Small-pox Hospital.*

To face page 100

Map V

THE BOROUGH OF WARRINGTON.

Showing the houses where one or more patients developed the eruption of Small-pox between the 1st and 30th November 1892.

Explanation of certain letters on this Map.

a, b, and c .... open spaces beside Old Fever Hospital.
d .... open space beside New (Temporary) Small-pox Hospital.

6114 7 94

MAP VI

THE BOROUGH OF WARRINGTON.

Showing the houses where one or more patients developed the eruption of Small-pox between the 1st and 31st December 1892.

Explanation of certain letters on this Map.

a, b, and c .... open spaces beside Old Fever Hospital.

d .... open space beside New (Temporary) Small-pox Hospital.

MAP VII.

THE BOROUGH OF WARRINGTON.

Showing the houses where one or more patients developed the eruption of Small-pox between the 1st and 31st January 1893.

Explanation of certain letters on this Map.

a, b, and c .... *open spaces beside Old Fever Hospital.*

d .... *open space beside New (Temporary) Small-pox Hospital.*

To face page 100.

MAP VIII.

THE BOROUGH OF WARRINGTON.

Showing the houses where one or more patients developed the eruption of Small-pox between the 1st and 28th February 1895.

Explanation of certain letters on this Map.

a, b, and c	open spaces beside Old Fever Hospital.
d	open space beside New (Temporary) Small-pox Hospital.

6114 7 94

MAP IX.

THE BOROUGH OF WARRINGTON.

Showing the houses where one or more patients developed the eruption of Small-pox between the 1st and 31st March. 1893.

Explanation of certain letters on this Map.

a, b, and c .... *open spaces beside Old Fever Hospital.*

d .... *open space beside New (Temporary) Small-pox Hospital.*

6114 7 94

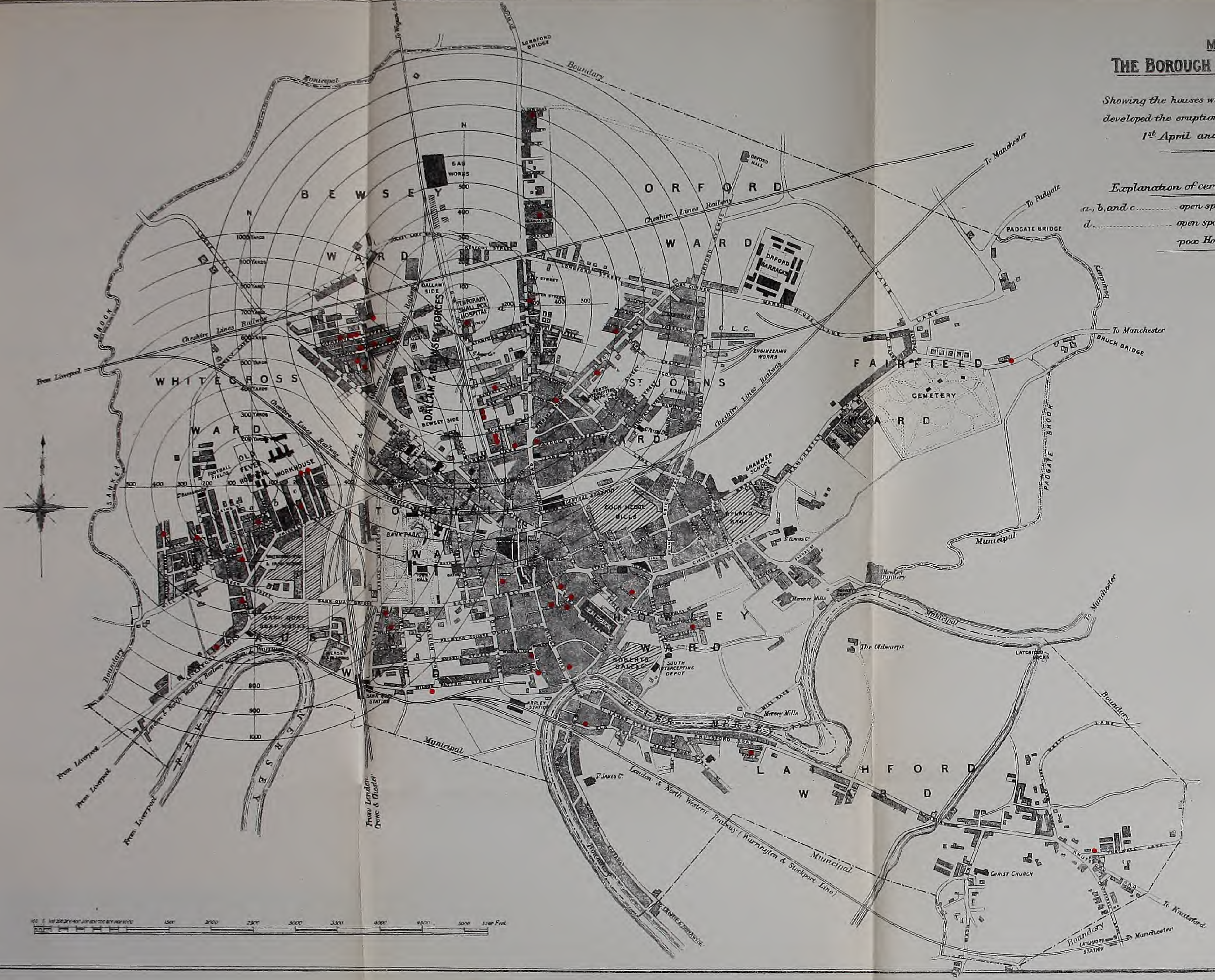
MAP X.

THE BOROUGH OF WARRINGTON.

Showing the houses where one or more patients developed the eruption of Small-pox between the 1st April and 10th May 1893.

Explanation of certain letters on this Map.

a, b, and c .... open spaces beside Old Fever Hospital.
d .... open space beside New (Temporary) Small-pox Hospital.



VACCINATION COMMISSION.

APPENDIX VI.

TO THE

FINAL REPORT

OF THE

ROYAL COMMISSION ON VACCINATION.

REPORT TO THE COMMISSION OF

DR. SIDNEY COUPLAND

ON THE

OUTBREAK OF SMALL-POX IN THE BOROUGH OF LEICESTER IN 1892-3.

Presented to both Houses of Parliament by Command of Her Majesty.

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Report on the Outbreak of Small-pox at Leicester, in 1892–3.

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INTRODUCTION.

Object of inquiry.

In pursuance of instructions from the chairman of the Royal Commission on Vaccination I visited Leicester on November 11th, 1892, to gain information concerning the appearance and spread of small-pox in that town, and in particular to ascertain the precise methods in force to deal with it. I was courteously received by the Sanitary Committee then sitting, and had an opportunity of learning from its chairman (Ald. Windley) the measures which had of late years been in operation for coping with this disease. Dr. Priestley, the Medical Officer of Health, kindly accompanied me to the Infectious Diseases Hospital and gave me particulars of the origin of the cases of small-pox which were then in the wards. Up to that time there were known to have occurred in the town 20 cases of small-pox, and the practice of prompt isolation on receipt of notification, not only of the patient, but of the persons known to have been in the company of the former had been carried out ; the small-pox case being taken to a detached wing of the hospital, and the rest lodged in quarantine in another part of the building. When the small-pox first appeared, scarlet fever was very prevalent in the borough, and the hospital was crowded with children in all stages of that disease. It is not surprising therefore that, in spite of precautions, small-pox attacked some of these fever patients, and six of these patients are included in the number of those who had been attacked up to that time, whilst two others were attendants employed at the hospital. At the time of my visit the wards had been cleared of scarlet fever, and from that date forward the whole hospital was given up to the reception of cases of small-pox and quarantined persons.

Period of inquiry.

I continued to visit Leicester periodically during the following year, and was thereby enabled to follow the progress of the epidemic, and to see personally nearly every case of small-pox admitted into hospital. The report which I now submit contains the information thus obtained. This report covers a period of 70 weeks, commencing from the week ending August 27th, 1892, to the week ending December 23rd, 1893. It will be seen that within this period one or more fresh cases arose in Leicester in each of the weeks except five, but that in no week did the number exceed 21, the average being five attacks per week. Of the total—357 cases, there were 12 which did not come to the knowledge of the Sanitary Authority until the occurrence of other cases subsequent to them. These cases had either not been visited by medical men, or had escaped notification, the mildness of their type causing them to be unrecognised at the time. The first case of all (W. S.) falls into this category.

Number of small-pox cases.

Hospital infection.

Besides the infection of the inmates of the fever ward in the early weeks of the outbreak, already alluded to, it is noteworthy that during a subsequent period there was a disproportionate incidence of small-pox upon the inhabitants of Newfound Pool, an outlying part of the borough, in the vicinity of the hospital. The thorough investigation made by Dr. Priestley into the origin of these cases points strongly to aërial infection of the locality from the small-pox wards. If this be so, it leads to the conclusion that more than one-fifth (viz. 77) of the whole number of cases received their infection directly or indirectly from the hospital. For of those known to have been infected at the building there were 19, viz. 13 children admitted for scarlet fever and 6 attendants or nurses who were attacked at various dates.* Three cases were infected from these ; whilst 55 occurred in the Newfound Pool district.

It is to be regretted that the proposal to erect new buildings upon another site for the accommodation of small-pox patients was not carried out.

Quarantine.

A point of especial interest in regard to the method of dealing with small-pox at Leicester is the system of quarantine of infected families, a plan which had been in use for some years, and was being carried out when I first visited the town. It seemed to me that in the adoption of this practice Leicester might claim to be distinctive, although to a large extent a like system has also been introduced at Glasgow, Leeds, and elsewhere. In other respects—notification, isolation of patients, house disinfection—the practices were similar to those in vogue in other places. Indeed, theoretically, such a system of quarantine—if carried out in its entirety—would seem to be especially applicable to the arrest of small-pox outbreaks, owing (1) to the definite period of incubation of the disease, and (2) to its infectivity prior to the appearance on the patient of a distinctive rash. Therefore a quarantine extending over 16 days from the removal of the patient would cover the period at which any case amongst those exposed to infection would be likely to arise; whilst the strict supervision of persons who have thus been exposed would enable steps to be at once taken to isolate any quarantined person who presented symptoms of illness. In practice the perfect adoption of this plan necessitates the provision of accommodation extensive enough to lodge the members of several families, besides requiring the willing co-operation of all concerned. For although its adoption ought to prevent an outbreak of small-pox from assuming epidemic proportions, yet when the disease is prevalent in all parts of the country, the liability of a town of the size of Leicester to receive fresh importations is very great. Indeed, it will be seen that many cases were thus imported during the present outbreak. Where the accommodation is insufficient, and especially where, as in this instance, the provision for quarantining is a building that practically forms part of the infectious hospital, there is not only an impossibility of fully carrying out the practice, but a risk lest the very measure intended to protect the community from further invasion, might really be the means of promoting this. It is not, therefore, to be wondered at that the Sanitary Authority was led to abandon this essential feature of the plan known as the "Leicester system," and to substitute for it the generally adopted practice of maintaining infected families under supervision in their houses during the "quarantine period" of 16 days. Nor was this "home-quarantine," as it has been termed, as rigid as is sometimes attempted. The inmates of the houses were permitted and were even encouraged to go out daily, provided they did not mingle with other folk, and in some cases were allowed to continue at their work. This change in practice would, it might be thought, have given an opportunity of estimating the value of the strict quarantine system by affording a comparison between the two methods. The difficulties in arriving at any conclusions are, however, insuperable, for they demand a fuller knowledge of the genesis of every case than it is possible to obtain. The general impression left on my mind is that where the cases of small-pox were early notified, the one method is as efficacious as the other in limiting the spread of infection from house to house. So far as the subject can be dealt with statistically, I have attempted it in this report.

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* To these cases of hospital infection there should perhaps be added the following :—No. 116, W. R., a plumber, at work in the building 14 days before sickening ; No. 155, W. H., apparently infected in quarantine ; No. 160, F. W., who came to meet her sister on her discharge from hospital ; No. 295, C. P., known to have been in close vicinity of hospital a fortnight before attack. Another case, No. 295, M. B., was infected by visiting an infected house in Newfound Pool (*see* Table of Cases). The inclusion of these cases would bring the total attributable to hospital infection up to 82. I find that Dr. Priestley adds some others dwelling "within the hospital area" at the north end of the town—making a total of 85. (*See* Report, Medical Officer of Health, 1893, p. 133.)

Comparative incidence on the unvaccinated.

Another matter upon which the experience of an epidemic of small-pox in Leicester is of value, is that which forms the main object of this inquiry. In a community of which the child-population is largely unvaccinated, the occurrence of small-pox may be expected to throw some light upon the degree and extent of the influence of vaccination upon (1) the liability to attack, (2) the severity of attack, and (3) the mortality from the disease. On these points it may be remarked that the incidence, severity, and fatality in this outbreak were disproportionately high amongst children, even after deducting those who were directly infected at the hospital. The analysis of the vaccination conditions of the members of 193 invaded households, which has been attempted in this report, would seem to show that in this epidemic, at least, the natural liability to small-pox, unaffected by vaccination, was not so great as has been supposed. Thus of the 1,234 persons in this community, 33 were under 1 year of age, 328 aged 1 to 10 years, 534 aged 10 to 30 years, 330 aged 30 years and upwards, and of 9 the age is not mentioned. It will be seen in the text that of those under 1 year—the unvaccinated form 91 per cent.—the small-pox attacks 21 · 2 per cent. (85 · 6 per cent. unvaccinated); of those aged 1 to 10 years—the unvaccinated form 74 per cent.—the small-pox attacks 28 · 9 per cent. (95 · 8 per cent. of those attacked being unvaccinated); of those aged 10 to 30 years—the unvaccinated form 15 · 5 per cent.—the small-pox attacks 28 · 1 per cent. (29 · 3 per cent. of those attacked being unvaccinated); of those aged 30 years and over—the unvaccinated form 2 · 7 per cent.—the small-pox attacks 20 · 5 per cent. (5 · 8 per cent. of those attacked being unvaccinated).

Having recently reported to the Royal Commission upon the outbreak of small-pox in the Dewsbury Union in 1891–92, I have thought that it might be instructive to contrast the main statistical results obtained in that inquiry with those gathered at Leicester. I have, therefore, compiled a few tables which form a supplementary note to the present report, whereby this comparison can be readily made. I may here premise that, except for the visitation of small-pox, there are but few points of similarity between these two centres. On the one hand, we have in Leicester a large Midland town with a population (in 1891) of upwards of 177,000 inhabitants, with a well-organised municipal government and thoroughly equipped sanitary organisation; whilst on the other there is in the Dewsbury Union a population of over 160,000 dwelling on an area three times as extensive as that of Leicester, and composed of 14 urban sanitary districts each with its separate sanitary officials. Again, in Leicester, notification of infectious disease has long prevailed, and is thoroughly enforced; in the Dewsbury Union, at the time of the small-pox outbreak, it had either been only recently carried into effect or had not then been adopted. Lastly, the provision for isolation of infectious diseases—which, although inadequate in Leicester, yet sufficed to accommodate all the cases of small-pox—in the Dewsbury Union was such that only about two thirds of the cases had hospital isolation. The time over which the inquiry extended was the same in each, viz., 70 weeks, and the number of cases of small-pox during this period in 1892–93, in Leicester, was 357, whilst in the Dewsbury Union, in 1891–92, it amounted to 1,029. The death-rate amongst these cases was 5·8 per cent. in Leicester, 10·7 per cent. in the Dewsbury Union. But as regards the relative severity of attacks—apart from their fatality—there will be seen to be a close parallelism in the two series. Thus, in Leicester, the confluent (and malignant) type of small-pox form 26·8 per cent. of the whole number; in the Dewsbury Union, 26·5 per cent.; the coherent type was met with in 15·6 per cent. in Leicester, in 12·1 per cent. in the Dewsbury Union; the discrete type in 21·8 per cent. in Leicester, and 32·3 per cent. in the Dewsbury Union; and of the mild or varioloid type there were 35·5 per cent. in Leicester, and 27·5 per cent. in the Dewsbury Union.

It will, however, be seen that the incidence of the disease was greater upon children over one year of age in Leicester than in the Dewsbury Union. Thus, the proportion of infants under one year of age who were attacked was 1·9 per cent. of those attacked at all ages in Leicester; 2·8 per cent. in Dewsbury Union; but of those aged between 1 and 10 years the proportions were: Leicester, 28·5 per cent.; Dewsbury Union, 18·9 per cent. (or between ages 1 and 15 years, Leicester, 38·9 per cent.; Dewsbury Union, 29·4 per cent.). The proportion of those aged 10 to 30 years was 45·1 per cent. for Leicester, 54·4 per cent. for the Dewsbury Union, whilst the two series were nearly equal for the periods 30 years and upwards, viz., 24·3 per cent. for Leicester, 23·1 per cent. for the Dewsbury Union.

Although in consequence of the larger number attacked and the smaller total of deaths, the comparative mortality of those aged 1 to 10 years was less at Leicester (12·7 per cent.) than in the Dewsbury Union (19·4 per cent.), yet, relatively to the whole number of deaths from small-pox, 61·9 per cent. at Leicester occurred in subjects of this age-period, as compared with 34·5 per cent. in the Dewsbury Union.

The proportion of unvaccinated amongst those attacked with small-pox was higher in Leicester (viz., 43·1 per cent.) than in the Dewsbury Union (33·6 per cent.); but on the other hand the statistics of 193 households invaded by small-pox in Leicester show a proportion of 24·4 per cent. of unvaccinated amongst the members of these households who escaped attack; but in 544 such households in the Dewsbury Union the proportion was only 11 per cent. These returns enable one to calculate that in Leicester 39·4 per cent. of the unvaccinated indwellers of invaded houses were attacked with small-pox; in the Dewsbury Union, 55·7 per cent.

It will further be seen that in Leicester, 96·1 per cent. of those attacked between the ages of 1 and 10 years were unvaccinated; in the Dewsbury Union, 70·2 per cent.

It does not appear from these figures that the disproportion, in the extent of the disease in the two areas compared was due to spread of infection within households; for it is remarkable that the proportion of houses (*i.e.*, of those in which particulars of the inmates were obtained) yielding single cases of small-pox is almost the same; it was 65·8 per cent. in Leicester and 65·2 per cent. in the Dewsbury Union. This concordance is the more surprising since, not only was hospital isolation much more generally carried out in Leicester, but with far greater promptitude on the whole. The difference between the two outbreaks is mainly that of diffusion, and so far as it is permitted for an outside observer to judge, it might be said that the limitation of the spread of small-pox in Leicester was due, amongst other factors, to the readiness with which the cases were dealt with by the Sanitary Authority, through the energetic action of the medical officer and his staff.

In conclusion, I beg to offer my sincere thanks to the Medical Officer of Health, Dr. Priestley, for his invariable courtesy and the kindness with which he placed his time and information at my disposal. I have also to thank the chief sanitary inspector, Mr. Braley, for his assistance, and the chairman and members of the sanitary committee for the facilities afforded me in conducting the inquiry.

Report on the Outbreak of Small-pox at Leicester in 1892–93.

§1. *Population; Birth Rate; Death Rate.*

The population of Leicester at the census of 1891 was 177,353, and the estimated population for 1893 was 184,547. It should be stated, however, that in October 1891, the borough was enlarged by the addition of nine districts comprising an area of 5,504 acres (with an estimated population 38,680). By this extension of boundaries, the area of the borough was more than doubled, viz.:—from 3,030 to 8,534 acres. The density of the population in 1893 was therefore 21·6 persons per acre; in 1890, prior to the extension, it was "50 persons per acre"; but in parts "more than double this."

The annual birth-rate per 1000 of total population during each of the 19 years 1875 to 1893, has ranged between 42·09 in 1876, to 30·43 in 1890. In 1893 it was 32·5.

The annual death-rate during the same period has ranged between 26·02 in 1875, to 16·68 in 1889. In 1893 it was 19·6.

The infantile mortality is high. In these years the proportion per 1,000 deaths at all ages of those dying under one year of age has varied from 399·5 in 1889 to 331·1 in 1879. In 1893 this proportion was 365·04. The proportion of those dying under the age of five years has been as high as 581·6 in 1880, and as low as 451·2 in 1890. This proportion in 1893 was 487·4.

[*See* Table I., compiled from the Annual Reports of Medical Officer of Health, which abound in valuable statistics.]

TABLE I.

LEICESTER—POPULATION, BIRTHS and DEATHS (from REPORTS of MEDICAL OFFICER OF HEALTH).

—	Estimated Population.	Births.		Deaths.		Deaths under one Year per of 1,000 Total Deaths.	Deaths under 5 years per 1,000 of Total Deaths.	Deaths in Public Institutions.	
		Total.	Per 1,000 of Population.	Total.	Per 1,000 of Population.			Total.	Per 1,000 of Total Deaths.
1875 - -	111,000	4,260	38·37	2,889	26·02	356·8	554·8	—	—
1876 - -	113,581	4,781	42·09	2,558	22·52	373·7	547·3	—	—
1877 - -	117,462	4,753	40·46	2,515	21·41	356·6	498·6	—	—
1878 - -	119,845	4,779	39·87	2,500	20·72	392·4	548·0	—	—
1879 - -	117,610	4,887	37·31	2,651	21·1	331·0	331·1	—	—
1880 - -	120,325	4,860	40·39	2,960	24·7	360·3	581·6	—	—
1881 - -	123,120	4,711	38·26	2,654	21·56	363·2	517·7	—	—
1882 - -	126,275	4,855	38·44	2,528	20·05	372·6	513·1	—	—
1883 - -	129,483	4,823	37·34	2,484	19·18	367·5	511·6	—	—
1884 - -	132,773	4,851	36·53	2,937	22·12	381·6	543·9	—	—
1885 - -	136,147	4,682	34·38	2,641	19·39	343·4	513·8	—	—
1886 - -	139,606	4,858	34·8	2,738	19·61	384·2	505·1	265	96·7
1887 - -	143,153	4,689	32·75	2,722	19·01	371·7	516·9	306	112·4
1888 - -	146,790	4,787	32·61	2,640	17·98	371·2	505·7	310	121·4
1889 - -	150,520	4,789	31·81	2,513	16·68	399·5	507·7	270	107·4
1890 - -	154,344	4,699	30·43	2,799	17·79	342·2	451·2	271	96·7
1891 - -	177,353	4,790	33·58	3,026	21·21	346·3	511·1	230	95·3
1892 - -	180,066	5,816	32·2	3,250	18·04	353·8	510·1	393	120·9
1893 - -	184,547	6,006	32·5	3,627	19·6	365·04	487·4	450	124·06

§2. *Zymotic Disease.*

In the accompanying series of Tables which I have prepared from the Annual Reports of the Medical Officers of Health, the mortality from zymotic diseases in Leicester since 1875 is given.

It will be seen (Table II.) that the comparative zymotic mortality has fluctuated during these years from a minimum of 98·2 per 1,000 of the total deaths from all causes in 1889, to a maximum of 263·1 in 1880, the years of greatest zymotic mortality being in order—1880, 1875, 1876, 1881, 1878, and those of lowest such mortality—1889, 1890, 1883, 1879, and 1877

As regards individual diseases, *diarrhœa—the* scourge of Leicester—has with one exception (1879) been responsible for the largest proportion of this mortality in each year, In 1886 (*see* Table III.) the rate per 1,000 deaths from zymotic disease was for diarrhœa as much as 651·4. and in 1890 it was 646·8. That this disorder has not diminished with the progress of sanitation is evident from these figures. Dividing the whole period into three terms of six years, we find the average proportion accruing to this disease, of the years 1875–80, 1881–86, 1887–92, to be 468, 500, and 491 respectively; the mortality for 1893 being considerably above this average.

TABLE II.

LEICESTER, 1875 to 1893.

DEATHS from ZYMOTIC DISEASE.

—	Small-Pox.	Measles.	Scarlet Fever.	Diph-theria.	Whooping Cough.	"Fever." Typhus.	Enteric.	Continued.	Diarrhœa.	Total.	Proportion of Deaths from Zymotic Disease to 1,000 of Total Deaths from all Causes.
1875	—	49	175	7	91	64			308	694	240·2
1876	—	50	173	10	33	43			263	572	223·6
1877	6	40	33	9	65	20			185	358	142·3
1878	1	45	12	5	82	31			302	478	191·2
1879	—	72	105	11	61	21			88	358	135·0
1880	—	166	119	23	27	46			398	779	263·1
1881	2	7	184	11	122	29			193	548	206·4
1882	5	74	72	5	19	19			214	408	161·3
1883	3	15	91	6	59	—	10	—	148	332	132·8
1884	—	57	63	11	66	—	16	—	344	557	189·6
1885	—	52	113	14	52	—	36	—	186	453	171·5
1886	—	43	44	4	27	—	19	—	256	393	143·5
1887	—	87	5	13	55	—	31	—	247	438	175·6
1888	—	77	4	13	86	—	32	—	148	360	136·3
1889	—	62	6	10	26	—	22	—	121	247	98·2
1890	—	30	38	11	16	—	24	—	218	337	120·4
1891	—	84	17	14	136	—	29	—	204	484	159·9
1892	6	126	41	10	52	—	17	—	214	466	143·3
1893	15	52	81	20	42	—	47	—	399	656	180·8

TABLE III.

LEICESTER, 1875 to 1893.

PROPORTION of DEATHS from ZYMOTIC DISEASES.

Per 1,000 ZYMOTIC DEATHS.

—	Small-pox.	Measles.	Scarlet Fever.	Diph-theria.	Whooping Cough.	"Fever" Enteric mainly.	Diarrhœa.
1875	—	70·6	252·1	10·	131·1	92·2	443·8
1876	—	87·4	302·4	17·4	57·6	75·1	459·7
1877	16·8	111·7	92·1	25·1	181·5	55·8	516·7
1878	2·1	94·1	25·1	10·4	171·5	64·8	631·8
1879	—	201·1	293·3	30·7	170·3	58·6	245·7
1880	—	213·	152·7	29·5	34·6	59·0	519·9
1881	3·6	12·7	335·7	20·0	222·6	52·9	352·2
1882	12·2	181·3	176·4	12·2	46·5	46·5	524·5
1883	9·	45·1	274·	18·0	177·7	30·1	445·7
1884	—	102·3	113·1	19·7	118·5	28·7	617·4
1885	—	114·7	249·4	30·9	114·7	79·4	410·6
1886	—	109·4	111·9	10·1	68·6	48·3	651·4
1887	—	182·	10·4	27·2	115·0	64·8	516·7
1888	—	214·	11·1	36·1	238·8	88·8	411·1
1889	—	251·	24·3	40·4	105·2	89·0	490·1
1890	—	89·	112·7	32·6	47·4	71·2	646·8
1891	—	173·5	35·1	28·9	280·9	59·9	421·4
1892	12·8	270·0	87·9	21·4	111·6	36·4	459·4
1893	22·8	79·4	123·4	30·4	64·0	71·6	608·2

Next in order of importance as a cause of mortality during these years comes *scarlet fever*, the prevalence of which is naturally more variable. In the five years 1887 to 1889, there was only an average of five deaths annually from this disease; whereas in the three years 1879 to 1881 the annual average was 136. Again, comparing its mortality with that from all the zymotics it is seen that the rate per 1,000 of the latter was for scarlet fever, in each of the three sexennial periods named, 186, 210, and 46 respectively. In 1893 the mortality was 123·4.

In measles the deaths throughout the whole period closely approximate those from scarlet fever, but they are somewhat more evenly distributed. Again, taking the sexennial term, the average annual death-rate (per 1,000) zymotic deaths, for this disease would be 130, 94, and 196 respectively; there being as high a proportion as 270 in 1892. The rate in 1893 was considerably below the average, viz. 79·4.

Lastly, as regards "*fever*," which practically means *enteric fever*, the mortality was highest in 1875, and next highest in 1885. The annual average for the three sexennial periods being 67, 47, and 68 per 1,000 of the total zymotic mortality. In 1893 it was 71·6.

Since 1879 Leicester has enjoyed the advantage of an act for the compulsory notification of infectious diseases, so that for nearly 15 years the statistics of certain of the zymotic diseases are more complete and furnish a better guide to their prevalence than mortality returns can do. In the Tables that follow (Tables IV., V., VI., VII.) figures based on these returns are given, first of the total numbers notified in each year, next of the proportion of cases of zymotic disease per million living, based on the population returns, and then of the relative proportion of cases of small-pox, scarlet fever, enteric fever, and diphtheria.

TABLE IV.

LEICESTER, 1879 to 1893.

CASES of ZYMOTIC DISEASE.

NOTIFICATIONS.

—	Small-pox.	Scarlet Fever.	Enteric Fever.	Diph-theria.	Erysi-pelas.	Puerperal Fever.	Total.
1879*	—	496	56	24	125	—	701
1880	—	802	245	87	442	6	1,582
1881	5	1,065	179	63	566	15	1,893
1882	29	763	110	38	455	14	1,409
1883	12	797	85	26	317	12	1,249
1884	3	728	55	184	239	—	1,209
1885	8	1,816	216	55	294	8	2,397
1886	1	817	141	51	258	12	1,280
1887	9	272	222	81	308	6	898
1888	21	132	266	67	255	8	749
1889	—	409	147	84	219	1	860
1890	—	516	165	75	207	3	966
1891	—	794	178	65	238	2	1,277
1892	39	1,331	116	67	316	5	1,874
1893	281	2,308	392	139	353	10 Cholera 1	3,484

"The numbers in 1880, 1881, 1882, 1883 are *Certificates* only, and may not include quite all the cases."

* In this year the cases are only reckoned from September 13th to the end of 1879, this being the first day the Act came into effect.

Years 1880 to 1893 inclusive, per 100 000 of Population and the Proportion of Cases of Scarlet Fever, Enteric Fever, Small Pox and Diphtheria.

1887.

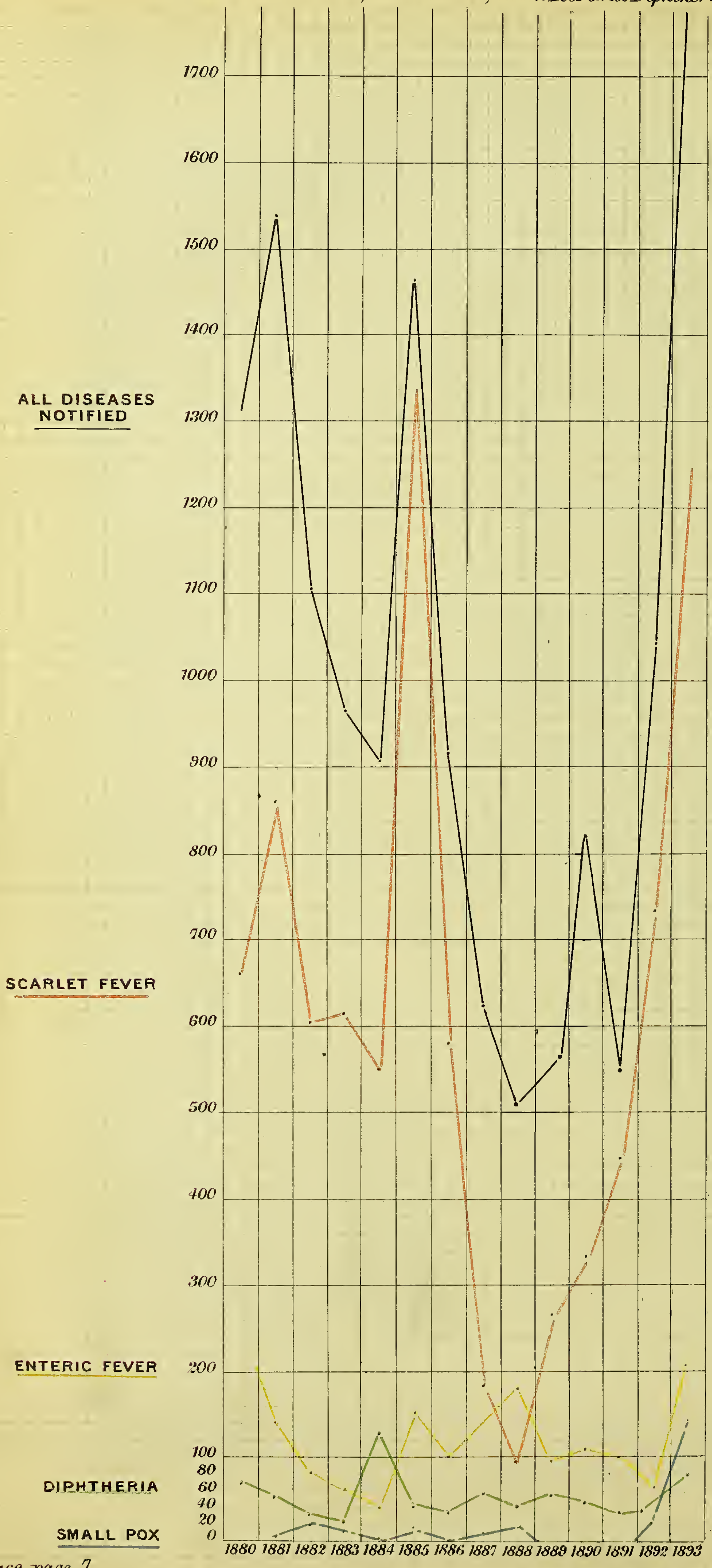

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Table V. (and Chart I.)*

Leicester, 1880–1893.

Proportion per Million Population of all Cases of Zymotic Disease notified, and of certain such Diseases in particular.

—	Estimated Population.	Proportion of all Zymotics.	Proportion of Small-pox.	Scarlet Fever.	Enteric Fever.	Diphtheria.
1880 - -	120,325	13,147	—	6,582	2,036	723
1881 - -	123,120	15,375	40	8,649	1,453	511
1882 - -	126,275	11,158	229	6,042	870	300
1883 - -	129,483	9,653	92	6,155	656	201
1884 - -	132,773	9,104	22	5,483	414	1,310
1885 - -	136,147	14,667	58	13,338	1,586	403
1886 - -	139,606	9,171	7	5,852	1,009	365
1887 - -	143,153	6,274	62	1,900	1,557	565
1888 - -	146,790	5,102	143	919	1,810	456
1889 - -	150,520	5,713	—	2,717	976	558
1890 - -	154,344	8,228	—	3,336	1,069	485
1891 - -	177,353	5,570	—	4,477	1,003	366
1892 - -	180,066	10,407	216	7,391	644	366
1893 - -	184,547	18,878	1,522	12,506	2,124	753

* *Explanation of Chart I.:—*

Chart showing the proportion of cases of certain of the zymotic diseases notified at Leicester per 100,000 *of the population, in the years* 1880 *to* 1893 *inclusive.*

Table VI.

Leicester, 1880–1893.

Relative Proportion (per 1,000) of Cases of Small-pox. Scarlet Fever, Enteric Fever, and Diphtheria, notified to the Sanitary Authority in Leicester, 1880–1893.

—	Small-pox.	Scarlet Fever.	Enteric Fever.	Diphtheria.
1880 - - -	—	707	216	77
1881 - - -	3	812	137	48
1882 - - -	31	812	117	40
1883 - - -	13	867	92	28
1884 - - -	3	750	57	190
1885 - - -	4	867	103	26
1886 - - -	1	810	139	50
1887 - - -	15	467	380	138
1888 - - -	43	272	547	138
1889 - - -	—	639	230	131
1890 - - -	—	682	218	100
1891 - - -	—	765	172	63
1892 - - -	25	857	75	43
1893 - - -	90	740	125	45

Table VII.

Leicester, 1880–1893.

Cases of Certain Zymotic Diseases, Deaths and Mortality.

—	Small-Pox.			Scarlet Fever.			Enteric Fever.			Diphtheria.		
	Cases notified.	Deaths.	Mortality	Cases notified.	Deaths.	Rate.	Cases notified.	Deaths.	Rate.	Cases notified.	Deaths.	Rate.
			Per cent.			Per cent.			Per cent.			Per cent.
1880 - - -	—	—	—	802	119	14·8	245	46	18·5	87	23	26·4
1881 - - -	5	2	40·	1,065	184	17·2	179	29	16·2	63	11	17·4
1882 - - -	29	5	17·2	763	72	9·4	110	19	17·2	38	5	13·1
1833 - - -	12	3	25·	797	91	11·4	85	10	11·7	26	6	23·
1884 - - -	3	—	*nil.*	728	63	8·6	55	16	29·1	184	11	6·
1885 - - -	8	—	*nil.*	1,816	113	6·2	216	36	16·6	55	14	25·4
1886 - - -	1	—	*nil.*	817	44	5·3	141	19	13·4	51	4	7·9
1887 - - -	9	—	*nil.*	272	5	1·8	222	31	14·	81	13	16·
1888 - - -	21	—	*nil.*	132	4	3·0	266	32	12·	67	13	19·4
1889 - - -	—	—	—	409	6	1·4	147	22	15·	84	10	11·9
1890 - - -	—	—	—	516	38	7·3	165	24	14·5	75	11	14·6
1891 - - -	—	—	—	794	17	2·1	178	29	16·3	65	14	21·5
1892 - - -	39	6	15·3	1,331	41	3·0	116	17	14·6	67	10	15·
1893 - - -	281	15	5·3	2,308	81	3·5	392	47	12·	139	20	14·3

Owing to notification also the actual rate of mortality from each of the notified diseases is available, and it will be seen from the above table (Table VII.) how this varies from year to year; the variations being most striking in the case of scarlet fever, and the rate more constant in enteric fever than diphtheria.

§3. *The Fever Hospital.*

The Borough Hospital for Infectious Diseases is situated on rising ground about 1½ miles from the Town Hall, to the north-west. When originally erected in 1870–71 it was well removed from inhabited dwellings, but within the past few years the adjoining district of Newfound Pool has been much built over. This district, formerly outside the borough, is now included within it; and one of its main roads runs from south to north—about 200 yards from the hospital site, separated by pasture land. On the other sides the hospital is fairly isolated—the Corporation owning some of the adjacent property, which is let in allotments—and a branch line of the Midland Railway runs through this land, skirting the grounds of the hospital.

In his report on the Use and Influence of Hospitals for infectious diseases, Dr. Thorne gives a full description of this building which remains much the same as at his visit in 1881. I may, therefore, extract some of the passages from his report, which describe it better than I could do. He writes :—

" Owing to a prevalence of scarlet fever in Leicester in 1870 and 1871, and to the fear that small-pox, then prevalent in several parts of the kingdom, might be imported into the borough, the Town Council determined in the latter year on the erection of some galvanised iron buildings to serve as a hospital for infectious diseases other than enteric fever, for which disease there is special provision in the fever house in connexion with the Leicester Infirmary. The site chosen consisted of about two acres of Corporation property known as Freake's Ground, which is situated just outside and to the north-west of the borough. During the erection of the buildings, however, small-pox became widely epidemic in Leicester; and it was found necessary to use certain premises in Friars Road as a temporary hospital. Later on, also, additional buildings were erected on Freake's Ground and hospital tents were brought into use.

"The hospital on Freake's Ground is known as the Borough Fever Hospital. The soil on which it stands is clay. Close by are some brick works and also the town deposit for ashes and dry refuse.

"The buildings are enclosed by a wooden fence and consist of (1) one principal group of buildings arranged along the sides of a common corridor (2); a detached ward-pavilion, and (3) certain out-buildings, including the porter's lodge, a laundry, a disinfecting chamber, an ambulance shed containing an ambulance fitted with a movable stretcher, and a mortuary.

"The principal buildings are constructed of galvanised corrugated iron painted outside, and they are lined throughout with wood. They rest on brick piers and have slate roofs. The corridor, which runs the whole length of the building, is well ventilated by means of double-hung sash windows in its opposite sides. On each side of the corridor are three detached buildings. Then on one side are the administration block, and two blocks containing accommodation for nurses and stores; on the other side are three separate ward pavilions known as 'fever wards.' The administration block contains the principal entrance lobby, rooms for the matron, nurses, and servants, a kitchen and scullery, a surgery and store room.

* * * * * *

"Opening out from one end of the corridor above referred to are some additional wooden buildings, which were erected on account of the small-pox epidemic of 1871. One building is now used for stores, another for additional sleeping accommodation for nurses, and a third is a ward pavilion retained for small-pox cases. This pavilion consists of three wards *en suite* and is partly roofed with slate and partly with felt. It has one window at the extreme end, but throughout its entire length the only windows consist of sheets of glass let into the walls about eight feet above the floor level, and ten others fitted in frames so as to open. The roof is lowered and there are apertures for ventilation in the centre of the floor. About the middle of the building is a small ward kitchen, and at the side are waterclosets somewhat imperfectly separated from the wards.

* * * * * *

"There is accommodation for 28 small-pox patients in this pavilion and when it is in use a communication with the remainder of the buildings is cut off by means of a doorway at the end of the corridor referred to. By means, however, of a sliding panel in the door, food and other necessaries are passed from one part of the building to the other. I am informed that hitherto there has been no spread of infection, either from this pavilion to the fever wards or by means of the common corridor, from one of these latter wards to another.

"The detached pavilion is professedly reserved for cases of erysipelas. In point of construction it is very similar to the small-pox pavilion, but it is somewhat dilapidated, and, apart from two rooms at one end and which were constructed as nurse's rooms, it is not fit for the reception of the sick. Both this and the small-pox pavilion were originally coated with tar. Since then they have been whitewashed, but they remain very unattractive in appearance."

In the first (1885) of the series of admirable annual reports which were compiled by the late Medical Officer of Health, Dr. H. Tomkins, the following remarks on hospital accommodation appear:—

"Leicester has for some years been provided with a hospital, such as it is, for this purpose (*i.e.*, isolation of infectious diseases), but unfortunately it belongs to that class of structures which until the last few years has too often obtained in other towns. Intended at first as a more or less temporary building, constructed hurriedly, and on an ill-designed plan, it may not inappropriately be termed an ugly makeshift. Having, however, been partly covered externally with corrugated iron, it has withstood the wear and tear of 12 or 13 years' use better than many others constructed entirely of wood. Erected originally to meet an outbreak of small-pox, it consists of five blocks, three containing one large ward each, and the other two only partially divided, and provides but unsatisfactory accommodation for the treatment of small numbers of patients, or for the convenient separation of such cases as may be desirable to isolate from others. It is also in many respects deficient in the accommodation and arrangements adopted in modern hospitals of this description."

Nevertheless in spite of these inadequacies the building has been maintained in full working order—throughout the 20 years of its existence. The main portion—with three wards coming off the corridor on the right hand, and administration offices on the left—has been always set apart for the reception of cases of scarlet fever, when its original occupation by small-pox patients in 1872 was over; and from that time until the autumn of 1892 no small-pox case was admitted into those wards. These three wards are well kept, and lighted and commodious; and are equal to those of many similar institutions in the country. But the same cannot be said of the two large detached pavilions, which form the wings of the hospital. These buildings are constructed of wood, the roofs covered by felt, and they naturally show far more evidence of the exposure and wear of twenty years than the rest of the hospital. The ground on which they stand slopes downwards to the east and consequently they are constructed in portions at different levels coming close to the railway above mentioned. Although lofty and capacious, they are bare and comfortless; and are lighted by continuous windows at the eaves. Nor have they been in constant use. The northern wing has been set apart for the reception of cases of small-pox which have occurred from time to time, up to the present outbreak; and at other times, measles and other infectious diseases have been accommodated. The southern block, which is more widely separated from the main building—the laundry, disinfecting station, &c. intervening—is termed the "erysipelas" ward, but has been devoted to other purposes also, *e.g.*, the reception of fever convalescents, and of persons quarantined for small-pox, or for doubtful cases. The accompanying illustration (*see* Plates I. and II.) from photographs taken at my request in January 1892, shows the nature of this building, and the state into which it has fallen. The interior is bare and is divided into three large wards,* all inter-communicating, one of which was set apart as a living room, and the others fitted up with beds when used for quarantine purposes. The sanitary accommodation is bad, and I am informed that the building is infested by rats. I cannot avoid expressing the opinion that these two wooden buildings are a reproach to the authorities, and that being clearly erected for a temporary purpose should long since have been replaced by more substantial structures.

In the autumn of 1892 an annex was built at the northern extremity of the corridor for the accommodation of the nursing staff, thus setting free some rooms which could be used as small wards.

Lastly, with the decline of the small-pox in 1893, it was resolved to re-open the wards to scarlet fever, and to erect a detached building in the north-eastern part of the site as a small-pox pavilion, a work which had just been completed when my visits ceased.

The use to which this hospital is put may be seen from the following return (Table VIII.) of the annual admissions since 1879 in comparison with the numbers notified in the borough. The vast majority have been cases of scarlet fever, of which disease 12,250 cases have occurred during the 14 years (1880 to 1893), and 5,560, or less than one half have been admitted. On the other hand, almost every case of small-pox notified has been isolated and a few cases admitted from outside the borough. It is noteworthy that, in 1893, when the hospital was closed to fever, more cases of that disease occurred in the borough than in any previous year in which notification has been in force.

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* During the small-pox outbreak—when this building was being used for quarantine—the lower wards were improved by being divided by wooden partitions into smaller rooms capable of accommodating varying numbers of beds, and permitting of the separation of the sexes. At my last visit I found these partitions had been removed, it being intended henceforth to utilise the building for scarlet fever convalescents.

WARDS OF THE LEICESTER FEVER HOSPITAL
USED FOR PURPOSES OF QUARANTINE DURING THE
SMALL POX OUTBREAK OF 1892-93.

Wyman & Sons. Ltd, Lith, 6516-12·94

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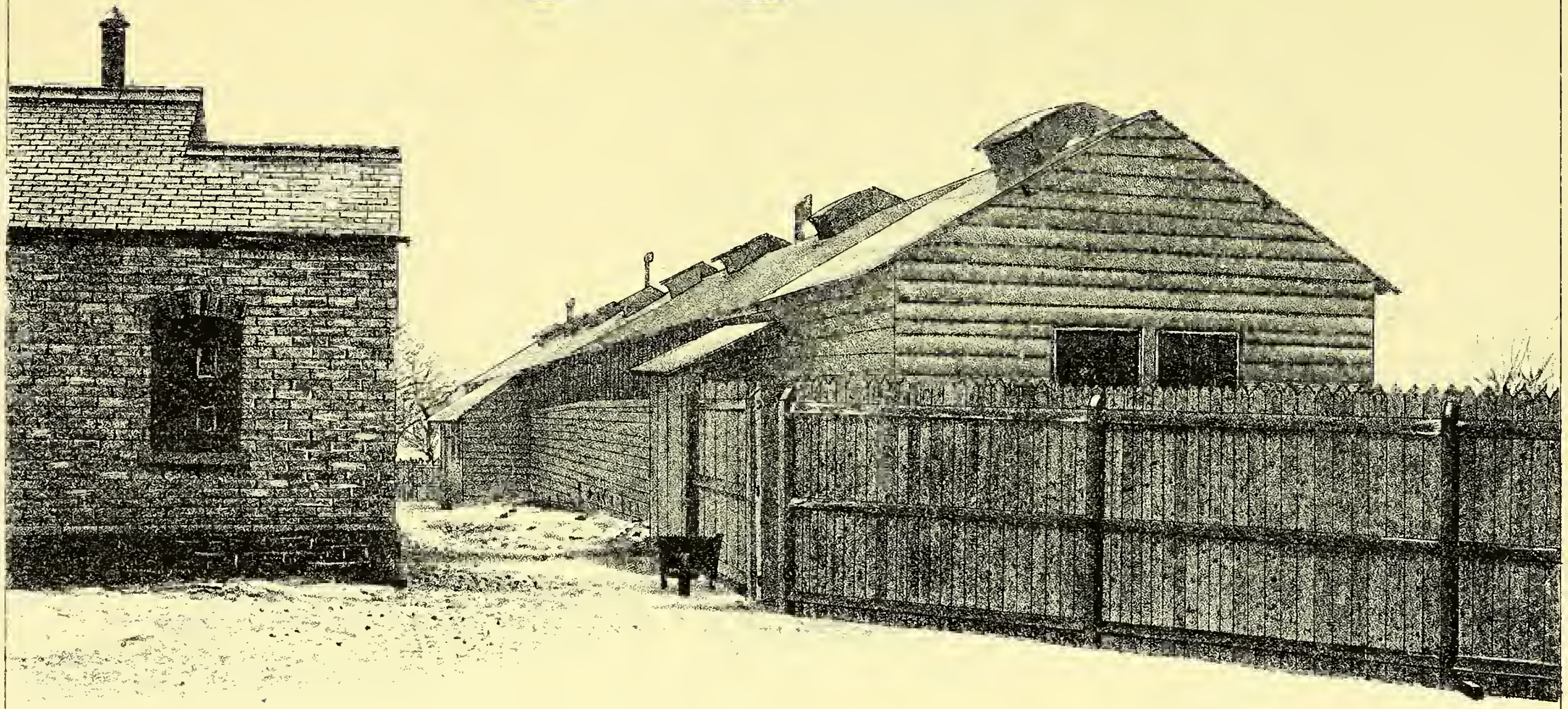
WARDS OF THE LEICESTER FEVER HOSPITAL
USED FOR PURPOSES OF QUARANTINE DURING THE
SMALL POX OUTBREAK OF 1892-93.



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To face page 8 (ii).

TABLE VIII.

LEICESTER FEVER HOSPITAL.

TABLE showing Number of Patients admitted since 1879, and the Number of Cases of Infectious Disease notified in the Borough.

——	Small-pox.		Scarlet Fever.		Enteric Fever.		Erysipelas.		Admission of other Diseases.		Quarantine.	——
	Notified.	Admitted.	Notified.	Admitted.	Notified.	Notified.	Notified.	Admitted.	Measles.	Unclassified.		
1880	—	1	802	230	245	5	442	47	—	—	Prior to 1885 no record of numbers quarantined.	
1881	5	6	1,065	388	179	—	566	46	—	—		
1882	29	30	763	460	110	—	455	44	—	—		
1883	12	12	797	383	85	—	317	12	—	—		
1884	3	6	728	384	55	—	239	5	—	—		
1885	8	8	1,816	900	216	—	294	3	—	3	10	
1886	1	1	817	439	141	—	258	—	10	5	2	
1887	9	10	272	151	222	13	308	1	—	2	14[a]	[a] 2 developed small-pox.
1888	21	23	132	94	266	—	255	1	—	—	39[b]	[b] 3 developed small-pox.
1889	—	—	409	327	147	1	219	1	1	—	—	
1890	—	—	516	471	165	3	207	1	1	4[c]	—	[c] Varicella, 1.
1891	—	—	794	636	178	—	238	—	2	12[d]	—	[d] Varicella, 6
1892	39	38	1,331	727	116	—	316	—	6	4[e]	97[f]	[e] Varicella, 4. [f] 2 developed small-pox.
1893	281	281	2,308	—	392	—	353	—	—	10	144[g]	[g] 14 developed small-pox.

§4. SMALL-POX in LEICESTER—1852 to 1891.

From the reports of the medical officers of health, information respecting the mortality from small-pox is available for a period of 40 years. This I have reproduced below, and have appended an estimate of the total number of cases on the basis of a mortality of 10 per cent.

TABLE IX.

DEATHS from SMALL-POX at LEICESTER, 1852 to 1891.

Year.	Estimated Population.	Small-pox Deaths.	Small-Pox, Estimated. (No. of Cases.)
1852	61,403	52	520
1853	62,164	11	110
1854	62,925	0	0
1855	63,686	0	0
1856	64,447	1	10
1857	65,208	17	170
1858	65,969	53	530
1859	66,730	3	30
1860	68,056	2	20
1861	68,257	1	10
1862	68,797	0	0
1863	72,130	5	50
1864	78,337	104	1,040
1865	80,500	10	100
1866	83,750	3	30
1867	86,000	2	20
1868	90,000	1	10
1869	91,500	0	0
1870	95,083	0	0
1871	97,500	12	120
1872	100,829	346	3,460
1873	102,515	2	20
1874	106,202	0	0
1875	111,000	0	0
1876	113,581	0	0
1877	117,461	6	60[*]
1878	121,473	1	10
1879	125,622	0	0
1880	120,325	0	0[†]
1881	123,120	2	5[‡]
1882	126,275	5	29
1883	129,485	3	12
1884	132,773	0	0
1885	136,147	0	8
1886	139,606	0	1
1887	143,153	0	7
1888	146,790	0	21
1889	150,520	0	0
1890	154,344	0	0
1891	177,353	0	0

[*] System of quarantine initiated. [†] Notification enforced. [‡] Actual number known.

In his report for 1883 Dr. W. Johnston, then Medical Officer of Health, points out that during the preceding seven years there had been no fewer than 17 importations of the disease, and he regards the continued exemption of the borough from any epidemic as being highly satisfactory, and "altogether due to the success which has hitherto "attended the efforts of the Health Committee in securing "not only the immediate reporting, but also the prompt "removal to hospital of all the cases as they came under "notice."

To this must be added the carrying out of a system of quarantining of those in contact with small-pox cases, which has formed a notable feature of the measures adopted in Leicester against the spread of small-pox. I propose, therefore to give a short account of the history of this system up to the present outbreak. In addition to published records, I have had the opportunity of conversing on the subject with the chairman of the Health Committee, Dr. Johnston, and Mr. Braley, to whom I tender my thanks for the information they freely gave me.

§5. SMALL-POX QUARANTINE IN LEICESTER.

The first mention of the adoption of a system of quarantine for all persons who had been presumably in contact with a case of small-pox occurs in Dr. Johnston's Report for 1877; and it is to this gentleman that is due the credit of having introduced this safeguard as a routine measure.[*] In 1877, 12 cases of small-pox were registered (this was prior to the introduction of notification). Dr. Johnston writes:—

"As the plan which I adopted in the removal of these cases is novel, and may be found useful by officers of health in other towns for preventing the spread of the disease, I may be pardoned, if I again draw attention to it. In every house where a small-pox case occurred I endeavoured to impress the inmates with the fact that the removal of *all* the members of the family to the hospital was the best course to adopt, not only as regarded their own individual welfare, but also that of the town at large, and I am glad to say that all complied with my request, left their infected habitations, and became inmates of the hospital. Altogether 22 unaffected cases were thus admitted into quarantine, and of these 3 after admission sickened. The first case sickened in 48 hours, the second in 72 hours whilst the third showed no symptoms of the disease until the 12th day. . . . The suppression of what might otherwise have proved a widespread epidemic, attended with great fatality, was entirely due to the early information recorded of the cases affected, and the promptitude observed in their removal."

It was the custom, Dr. Johnston informed me, for the Corporation to pay the wages of the quarantined during their fortnight's detention; and they were allowed comparative freedom within the hospital grounds.

Nor was the removal to quarantine in all cases restricted to the members of an infected household; if it appeared that others had been in prolonged contact with the patient they also were persuaded to take this step.

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[*] In his report for 1875 (p. 5), the late Dr. Crane, then medical officer, states that he removed to the hospital a child suffering from small-pox *together* with its parents. The child died, but the parents who had thus been practically "in quarantine" did not take the disease.

Hitherto there had been few objections on the part of individuals to go into quarantine; but in the few instances in which this had occurred, they were visited daily by the sanitary inspector and any signs of failing health reported to the Medical Officer. On one occasion Dr. Johnston succeeded in removing all the inmates of a lodging-house, 39 in number, two cases of small-pox having occurred in tramps who were dwelling there.[*] Again, in case of refusals, not only were the infected dwellings watched, but the employers of those who were engaged at work were informed of the fact that there was small-pox in the house. No more pressure was put on the folk than this, and it generally sufficed. Indeed, Mr. Braley informed me that he had never known a man lose his employment because of his detention in quarantine.

Although apparently, since the introduction of this system up to the present outbreak, there has been no instance of a quarantined inmate contracting small-pox at the hospital from proximity to the small-pox wards, it should be borne in mind that until 1892 the small-pox cases were confined to the special wing and not introduced into the main building. Mr. Braley recalled an instance in which the period of quarantine was too short, viz., only 12 days, and after the family returned home another member sickened, and the rest had all to undergo another fortnight's quarantine.

The part of the hospital buildings utilised for the purposes of quarantine has not invariably been the same. (*See* annexed Plan III.) In the first instance the large wooden building close to the entrance (south side) and farthest from the wards was utilised. It had since its erection been mainly devoted to cases of erysipelas, which used then to be admitted to the hospital, and was often spoken of as the "erysipelas ward," for it was then a single shed. It was subdivided into three large wards during Dr. Tomkins tenure of office, and apportioned by him to the reception of convalescent fever patients,[†] to which purpose it remained devoted until the present small-pox outbreak, when it has again been utilised for quarantine. In the meantime, two small wards at the north end of the building (marked 9, 10, in plan) opening into the corridor on the one hand and externally on the other, were set apart for quarantine; and have thus come to be known as the "quarantine wards." They are situated within a few yards of the north building (detached) used for the reception of cases of small-pox.

To show how seriously deficient is the accommodation in this hospital, it may be said that when not in use for quarantine these two rooms were occasionally utilised as a nurses' dormitory,[‡] and that even when small-pox cases were in hospital, the nurses occupied two small rooms of the block apportioned to small-pox. The erection of an additional building for the nursing staff beyond this block was fortunately completed before small-pox became prevalent in 1892.

It has not been possible to get complete statistics of the numbers sent into quarantine since the system was initiated, but the returns for recent years have been kept.

—	Cases of Small-pox admitted from Borough.	Numbers of Persons in Quarantine.
1877 - - -	12	22
1878 - - -	8	96 ?[§]
1879 - - -	—	
1880 - - -	1	
1881 - - -	6	
1882 - - -	25	
1883 - - -	9	
1884 - - -	3	
1885 - - -	8	10
1886 - - -	1	2
1887 - - -	9	14[‖]
1888 - - -	21	39[¶]
1890 - - -	—	
1891 - - -	—	
	103	183

If these figures are correct it is obvious that they cannot include all those who were exposed to the possibility of infection from the 103 cases of small-pox primarily admitted into hospital during these years.

The advantages of a quarantine system, if it could be practically enforced, are:—

(1.) The prevention of spread of disease by persons coming from infected houses.

(2.) The detection at the earliest possible moment of members of the family developing small-pox subsequent to the first case.

(3.) The facilities it affords for thorough disinfection and cleansing of the house vacated by the family.

But to be practically effectual this system not only requires the cordial co-operation of all concerned, but needs that the accommodation supplied by the authorities should be adequate and acceptable. So long as only a few cases of small-pox are present in a borough, it may be possible to meet these wants without entailing too much expense. But if the disease attain epidemic proportions the mere housing of all the families infected must entail the provision of adequate accommodation on a scale that few towns could furnish. Then, too, where as at Leicester the quarantine accommodation is of the barest, and the commingling of the quarantined in sleeping and dwelling rooms unavoidable, residence in quarantine for a fortnight might well be dreaded by self-respecting people.

On the other hand, if the system is to be carried out with efficiency and to be regarded by the people at large as a salutary provision, and one to which they ought to submit for the sake of the community, the town should see to it that the buildings provided for the purpose are of such a character as to supply comfort and privacy to every family.

In this regard Leeds[*] has advanced far beyond Leicester, for it has erected a considerable number of cottage dwellings for temporary occupation by the quarantined. Having had the opportunity of contrasting the provisions in the two towns, it has, I confess, been a matter of surprise to me that the Leicester people should have rested satisfied with the accommodation provided for them.

It is not surprising, then, that in 1893 it was found necessary to abandon the system of interning families in the hospital quarters, and to substitute for it the practice (which had always been adopted when persons refused to go to hospital quarantine) of daily inspection of infected houses, a practice which is customarily carried out in other towns during epidemics of small-pox. I am not prepared to say that with due vigilance this ordinary and obvious method may not be almost as efficacious for the purpose as that of hospital quarantine. It lacks, however, the advantage of the individuals living under constant medical supervision.

§6. *Procedure in dealing with Small-pox.*

In the case of a disease so highly contagious as is small-pox a great deal of the efficacy of the measures taken to deal with it must depend upon the promptitude and vigour with which they are carried out. I can fully testify that these qualities animate the Leicester sanitary authority in their treatment of small-pox. Upon the receipt of the notification, the ambulance is sent to convey the patient to hospital; and the chief sanitary inspector institutes inquiries as to the possible source of infection of the case. During the present outbreak I have been struck by the diligence with which the medical officer and chief sanitary inspector have thus prosecuted inquiries, with the result that I think fewer cases have been left "untraced" than often happens. The history of the patient during the previous fortnight is minutely inquired into; and in particular information is gathered as to those who may have been in contact with him or have visited the house since it became infected. This, it seems to me, is often a matter of difficulty; for it is hardly safe to assume that the dwelling has only been infected since the patient sickened. He may be (and indeed not infrequently is) the medium of infection of other members of the family through fomites in his clothing 12 or 14 days before he has any symptoms himself; and similarly he may convey the contagium to fellow-workers in a factory, to a school, or to persons with whom he has social or business relations. The risk of this is not so great obviously as is that of infection from himself direct; but here, too, it must be borne in mind that the pre-eruptive stage of the disease is an infectious period, and the removal of a case as soon as its nature is determined, *i.e.*, when the rash is well out (about fourth or fifth day) will not prevent, although it may greatly diminish, the chances of further cases occurring in the household. It will be seen subsequently that a large proportion of the cases were removed early in the disease.

On removal of the case, and of the household (if sent to quarantine) the house is fumigated with sulphur; "liquid "disinfectants are used freely in the drains and about the "yard; and the ashpit is emptied and disinfected; the

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[*] I was informed by Mr. Biggs (December 20, 1892), that originally the quarantine hospital block was only intended for tramps, &c.; and that families were taken in subsequently.

[†] As many as 100 children convalescent from scarlet fever have been lodged here at one time.

[‡] These rooms have not, however, been used for this purpose during the tenure of office of the present matron, *i.e.*, the past nine years.

[§] I was informed by Mr. Biggs that from 1877 to 1885 inclusive there had been 128 persons quarantined, but there is no official record of the numbers in these years.

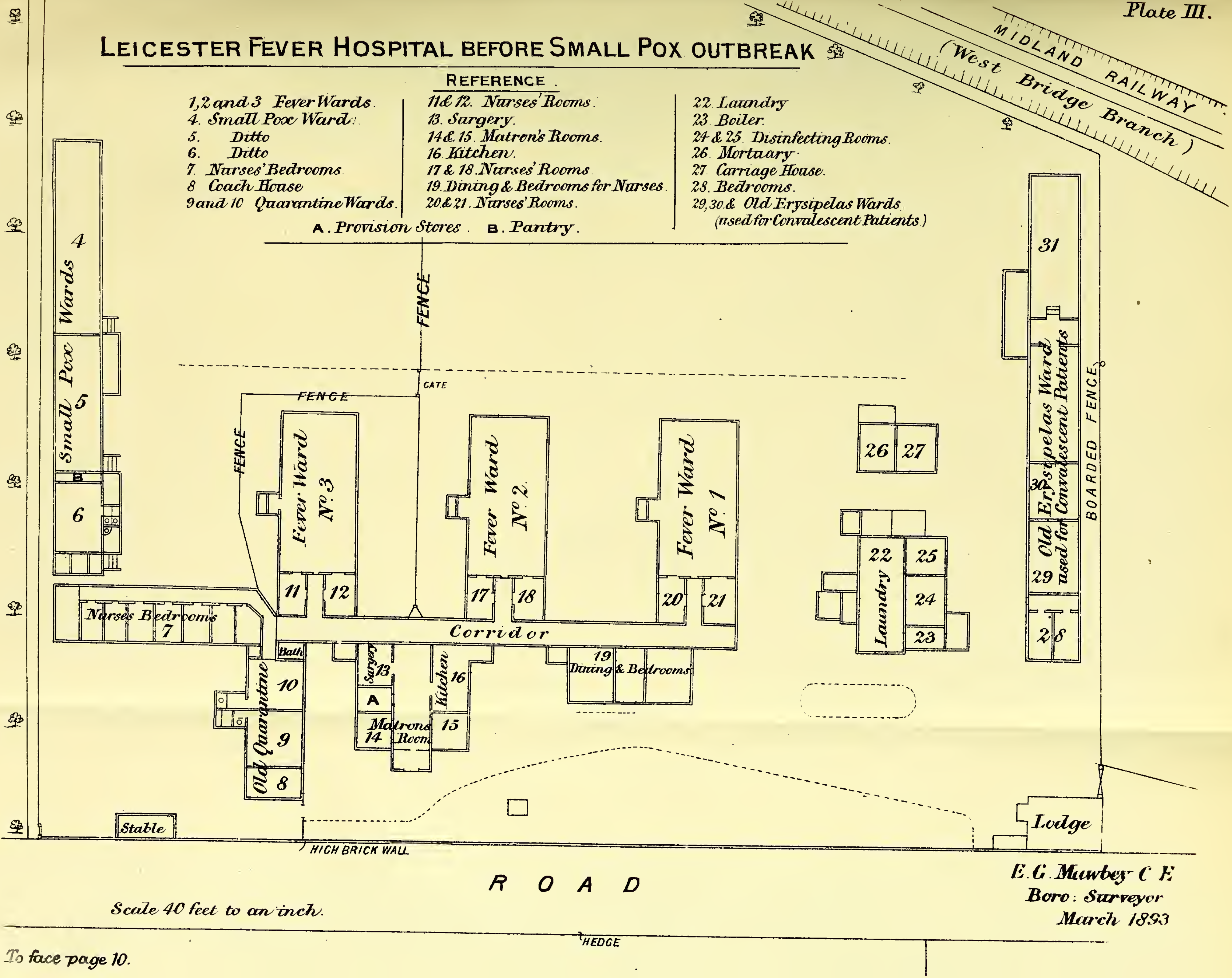
[‖] Two developed small-pox and appear in that column also.

[¶] Three developed small-pox and appear in that column also.

[*] At Glasgow, too, there is considerable provision for similar quarantine.

Plate III.

LEICESTER FEVER HOSPITAL BEFORE SMALL POX OUTBREAK



REFERENCE.

1, 2 and 3 Fever Wards.
4. Small Pox Ward.
5. Ditto
6. Ditto
7. Nurses' Bedrooms.
8 Coach House
9 and 10 Quarantine Wards.
11 & 12. Nurses' Rooms.
13. Surgery.
14 & 15. Matron's Rooms.
16. Kitchen.
17 & 18. Nurses' Rooms.
19. Dining & Bedrooms for Nurses.
20 & 21. Nurses' Rooms.
22. Laundry
23. Boiler.
24 & 25. Disinfecting Rooms.
26. Mortuary.
27. Carriage House.
28. Bedrooms.
29, 30 & Old Erysipelas Wards
(used for Convalescent Patients.)

A. Provision Stores. B. Pantry.

Scale 40 feet to an inch.

E. G. Mawbey C E
Boro: Surveyor
March 1893

To face page 10.

"next day the bedding is taken to the disinfecting chamber "and subjected to the hot air process."[*]

The disinfecting chamber was one of Ransome's, exchanged in 1888 for a more efficient steam disinfector by Goddard and Massey. It is erected on the hospital grounds.

Before leaving the hospital the patients have a final disinfecting bath, and their clothes are strongly disinfected.

§7. THE DECLINE OF VACCINATION IN LEICESTER.

I have not deemed it necessary to enter into any details concerning the history of vaccination in Leicester, as upon this subject abundant information has already been furnished to the Commission.

In view of the present outbreak it may, however, be of interest to quote the statements of Dr. Tomkins, late medical officer of health, in his annual report for the year 1887. He there writes (p. 72):—

"For the past two years all compulsion or any attempt to carry out the vaccination laws has been abandoned, and thus not only those persons who have a disbelief in the protection afforded by this operation against an attack from small-pox, or have any other conscientious objection to it, are amongst the defaulters, but also large numbers of that numerous class who, from sheer carelessness and thoughtless ignorance, neglect to protect their children from this loathsome disease.

"It is only from about the year 1883 that any considerable number of children have been allowed to grow up in the town without being vaccinated. An instructive return was published last year by the Leicester Guardians, which showed that out of 33,659 children born from 1880 to 1886, both years inclusive, only 14,024 were known to have been vaccinated. It shows also that 4,765 had died unvaccinated, leaving a total of 14,870 who had not been submitted to that operation. Seeing, however, that the mortality of children under five years of age is in Leicester very high, it will not be over-estimating it to set down another 2,000 deaths as having occurred amongst these 14,870 unvaccinated children. It is to be noted also that 6,430 have accumulated during the last two years to which the report refers, *i.e.*, in 1885 and 1886. Speaking roughly from these dates, it may be assumed that there are from twelve to fourteen thousand unvaccinated children to-day within the borough, or some 10 to 12 per cent. of the entire population.[*] These particulars will be of interest, not only to the inhabitants of Leicester, but to the country at large, which is watching with some interest as to what may be the ultimate result of this wholesale neglect of vaccination. They will also serve to correct the exaggerated notions that prevail in some quarters, that by far the greater proportion of the inhabitants of Leicester are unvaccinated, whereas exactly the opposite condition is the fact. Should, however, the present state of things continue to go on, and 10 per cent. only of the children born are vaccinated, as happened last year, then in the course of eight or ten years from the present time, there will have accumulated a sufficient amount of 'inflammable material' to warrant the use of the term 'Leicester experiment' being applied to the town. Whether the present vigilant measures of isolation and quarantine will suffice to successfully deal with any outbreak of small-pox which may then arise, time only can prove. One thing is, however, certain, that any of these unprotected children have but to be brought in contact with a breath of infection from small-pox to almost invariably contract the disease."

TABLE X.

RETURN of VACCINATIONS in the LEICESTER UNION.

Year.	Births Registered during Year.	Of the Children whose Births were Registered during the Year given in the First Column, by the 31st January in the Year next but one following that Year there were:—						
		Successfully Vaccinated.	Certified as Insusceptible of Vaccination.	Had Small-pox.	Died Un-vaccinated.	Vaccination postponed by Medical Certificate.	Remaining.	The Children not finally accounted for (including Cases postponed) being per cent. of Births.
1872	4,154	3,422	6	16	574	136		3·3
1873	4,446	3,730	6	0	555	5	150	3·5
1874	4,365	3,590	9	0	643	19	104	2·8
1875	4,256	3,400	10	0	662	12	172	4·3
1876	4,773	3,650	9	1	679	27	407	9·1
1877	4,749	3,509	7	0	647	37	549	12·3
1878	4,777	3,260	4	0	707	108	698	16·9
1879	4,695	3,086	2	0	722	25	860	18·8
1880	4,860	3,010	5	0	816	14	1,015	21·2
1881	4,712	2,948	3	0	687	47	1,027	22·8
1882	4,855	2,660	7	0	720	36	1,432	30·2
1883	4,819	1,967	8	0	735	6	2,103	43·8
1884	4,849	1,700	9	1	818	24	2,297	47·9
1885	4,690	1,481	6	0	760	14	2,429	52·1
1886	4,864	655	2	0	847	3	3,357	69·1
1887	4,693	343	3	0	961	0	3,386	72·2
1888	4,805	220	0	0	885	0	3,700	77·0
1889	4,786	127	4	0	834	0	3,821	79·8
1890	4,697	118	0	0	882	1	3,696	78·7
1891	4,785	74	1	0	885	0	3,825	79·9
1892	5,816	132	0	0	1,024	0	4,660	80·1

It may be remarked that according to the returns furnished by the Medical Officers of Health the numbers vaccinated at the public stations have fallen of late years more rapidly than the private vaccination, the former being in 1887, 188; 1880, 80; 1889, 31; 1890, 12; 1891, 6.

§8. SMALL-POX AT LEICESTER.

1892–93.

Early in the year 1892 a doubtful case of small-pox occurred in the town, but no other cases arose from it. The patient was, however, promptly isolated, and six inmates of the same house were removed to the hospital and detained in quarantine for a fortnight.

At the end of August a case was introduced into the town in the person of a tramp admitted into the Workhouse Infirmary. From that time for a period of 70 weeks—with one or two exceptions—cases continued to occur, *i.e.*, from the week ending August 24th, 1892, to the week ending December 27th, 1893.

The following account will be strictly confined to this period, and the cases considered include not only those that were duly notified, but also those cases that passed unrecognised at the time (most of whom never sought medical advice) but subsequently came to the knowledge of the authorities.

The total number of cases thus collected amounts to 357, of whom 181 were males and 176 females.

There were 21 deaths, a mortality of 5·8 per cent.; but of the males there were only 7 deaths or 3·5 per cent.; of the females, 14 deaths, or nearly 8 per cent.

In the following table a detailed list is given of these cases, which are recorded in the order of their onset, and appended is a record of the number of inmates of the houses whence they came arranged in four age-periods:—

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[*] Statement by chief sanitary inspector quoted by Mr. Biggs in an article, "How Leicester deals with Small-pox." Reprint from "The Vaccination Inquirer," November 1, 1892.

[*] It will be seen subsequently that out of 1,231 inmates of 193 households invaded by small-pox in 1892–3, there were 361 children living below the age of ten years, and that 283 of these children were unvaccinated, a proportion of 23 per cent. of this limited population.—S. C.

Table of Cases of Small-pox.

Leicester, 1892–3.

No.	Name.	Sex.	Age.	Notification.	Onset.	Rash.	Admission to Hospital.	Termination.	Type of Attack.	Result.	Duration in Days.	Vaccination Data.	Remarks.	Clinical Features of Attack.	Households. All Inmates.				
															Ref. No.	Under 1 Year.	1 to 10.	10 to 30.	30 Years upwards.
Col. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
1	W. S.	M.	35	1892. Sept. 9	1892. —	1892. Aug. 24	1892. Aug. 24 W	1892. Aug. 30	Mild	Rec.	8 ?	Infancy: small smooth marks.	A tramp admitted to workhouse Aug. 24.	Not recognised	—	—	—	—	—
2	S. M.	F.	23	" 9	Sept. 4	Sept. 8	Sept. 9	Oct. 22	Discrete	"	49	Infancy: 2 marks	Living at lodging-house where No. 1 went on Aug. 20.	- - - -	2	—	—	2	—
3	J. B.	F.	28	" 10	" 5	" 7	" 10	Nov. 3	Confluent	"	60	*Unvaccinated*	Do. do. do.	Dusky rash; high fever.	3	1	—	1	1
4	W. H.	M.	57	" 12	—	" 9	" 10	Sept. 16	"	Died	8	Uncertain. (Had been in navy.)	Debilitated by tertiary syphilis. Occupied bed in ward at workhouse next to No. 1.	- - - -	—	—	—	—	—
5	E. B.	F.	9 months.	—	Sept. 27	" 27	—	—	Mild	Rec.	?	"Under" vaccination	- - - - -	A doubtful case	3	—	—	—	—
6	E. J. K.	M.	35	Oct. 3	" 28	Oct. 3	Oct. 3	Dec. 3	Confluent	"	67	Infancy: 4 marks	- - - - -	Onset and eruption severe, but arrest at maturation.	4	—	3	1	2
7	E. K.	F.	4	" 19	Oct. 14	" 15	" 19	" 10	Mild	"	58	"Under" vaccination, Oct. 4; 2 marks.	Sent to quarantine Oct. 3. Developed scarlet fever Oct. 11.	Rash at first mistaken for varicella.	4	—	—	—	—
8	P. J.	F.	21	" 21	" 12	" 17	" 21	" 5	Confluent	"	38	Infancy: 4 foveate marks.	No. 5, taken charge of by Mrs. G. on its leaving quarantine, Sept. 19.	- - - -	5	—	—	1	2
9	E. R.	F.	24	" 21	" 17	" 19	" 20	" 17	Confluent (with hæmorrhage).	"	62	*Unvaccinated*	Neighbour to No. 8, often nursed No. 5.	High fever; delirium	6	—	—	4	1
10	G. M.	M.	57	" 25	" 18	" 21	" 25	" 24	Coherent	"	68	Infancy; 3 marks	Did not lie up at first	Iritis	7	—	—	—	—
11	G. B.	M.	4	" 31	" 26	" 27	" 28	" 19	"	"	55	*Unvaccinated*	Admitted for scarlet fever Oct. 7. Varicella Oct. 11; sent to special ward where No. 6 admitted on Oct. 15.	- - - -	—	—	—	—	—
12	E. L.	F.	3	Nov. 3	" 26	" 29	" 31	Nov. 21	Malignant	Died	27	"	Admitted for scarlet fever Oct. 18	Adenitis	—	—	—	—	—
13	T. G.	M.	43	Oct. 29	" 27	" 29	" 29	Dec. 24	Confluent	Rec.	59	Infancy: 3 marks	Employed in hospital attending to fires, &c.	- - - -	8	—	—	—	—
14	J. F.	M.	3	Nov. 3	29	" 31	" 31	" 18	"	Died	51	*Unvaccinated*	Admitted for scarlet fever Sept. 15. Varicella Oct. 10. Sent to special ward Oct. 12, where No. 6 admitted on 15th.	- - - -	—	—	—	—	—
15	F. B.	M.	7	" 3	" 29	Nov. 1	Nov. 1	1893. Feb. 9	"	Rec.	104	"	Admitted for scarlet fever Oct. 19	Adenitis	—	—	—	—	—
16	S. W.	F.	5	" 3	" 30	"	Oct. 31	1892. Dec. 10	Discrete	"	42	"	Admitted for scarlet fever Sept. 15. Varicella Oct. 6. No. 6 placed in same bed Oct. 15.	- - - -	—	—	—	—	—
17	M. A. J.	F.	45	" 5	Nov. 2	" 4	Nov. 4	Nov. 14	Confluent	Died	13	Infancy: 2 marks	Hospital laundress; intemperate; refused re-vaccination.	- - - -	9	—	—	1	2
18	M. S.	F.	35	" 5	" 3	" 5	" 5	Dec. 31	"	Rec.	59	" 2 "	Aunt to No. 9, where she visited before removal.	- - - -	10	1	—	2	1
19	T. R.	M.	45	" 6	"	" 5	" 5	1893. Jan. 14	"	"	73	" 3 "	Same lodging-house as No. 10	Pleurisy; bronchitis	7	—	—	—	—
20	N. H.	F.	7	" 10	" 3	" 5	" 9	1892. Dec. 17	Discrete	"	45	*Unvaccinated*	Scarlet fever followed by varicella. Left hospital 15th.	- - - -	11	—	1	2	2
21	H. C.	F.	7	" 16	" 1	" 12	" 14	Nov. 21	Confluent	Died	12	"	Admitted with scarlet fever Oct. 9	Hæmorrhagic rash; delirium.	—	—	—	—	—
22	W. W.	M.	49	" 15	" 12	" 14	" 14	1893. Jan. 9	Coherent	Rec.	59	"	- - - - -	- - - -	—	—	—	—	—
23	R. L.	M.	6	" 18	" 18	" 16	" 19	1892. Dec. 31	"	"	49	"	- - - - -	Conjunctivitis	12	—	3	2	2

TABLE OF CASES OF SMALL-POX—*cont.*

No.	Name.	Sex.	Age.	Notification.	Onset.	Rash.	Admission to Hospital.	Termination.	Type of Attack.	Result.	Duration in Days.	Vaccination Data.	Remarks.	Clinical Features of Attack.	Households. All Inmates. Ref. No.	Under 1 Year.	1 to 10.	10 to 30.	30 Years upwards.
Col. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
24	J. H. J.	M.	21	1892. Nov. 19	1892. Nov. 14	1892. Nov. 16	1892. Nov. 18	1893. Jan. 7	Coherent	Rec.	54	Infancy : 3 marks		Gastritis Nov. 28	13	—	—	9	2
25	E. P.	M.	4	„ 23	„ 16	„ 20	„ 20	„ 7	Confluent	„	53	*Unvaccinated*	Admitted for scarlet fever Oct. 28	Abscesses	—	—	—	—	—
26	F. H.	M.	8	„ 23	„ 18	„ 21	„ 23	„ 21	„	„	65	„		Keratitis; tonsilitis	14	—	3	3	2
27	W. Y.	M.	30	„ 25	„ 19	„ 23	„ 24	1892. Dec. 15	Mild	„	27	Infancy : 3 marks		Some doubt as to this being varicella	15	—	1	1	1
28	L. D.	F.	9	„ 26	„ 23	„ 25	„ 26	1893. Jan. 28	Confluent	„	67	*Unvaccinated*	Admitted for scarlet fever Oct. 27. Sent home Nov. 27.	Delirium; dusky rash	16	—	4	2	2
29	M. R.	F.	4	Dec. 4	„ 29	Dec. 1	Dec. 3	„ 28	„	„	61	„	Admitted for scarlet fever Oct. 28. Sent home Nov. 15.		17	1	2	2	2
30	A. J.	M.	7	„ 7	Dec. 2	„ 4	„ 6	1892. Dec. 15	„	Died	14	„	Admitted for scarlet fever Oct. 19. Sent home Nov. 29.	Laryngitis; broncho-pneumonia.	18	1	3	4	2
31	C. H.	M.	7	„ 9	„ 4	„ 5	„ 6	1893. Jan. 21	Discrete	Rec.	49	„	Brother to 26. Quarantine Nov, 23	Albuminuria	14	—	—	—	—
32	K. L.	F.	33	„ 10	„ 7	„ 9	„ 10	„ 7	„	„	32	Infancy : 3 marks	Mother to No. 23. Quarantine Nov. 19 to Dec. 1.	Swollen breast	12	—	—	—	—
33	W. J. S.	M.	13	„ 21	„ 10	„ 16	„ 21	Feb. 20	Confluent	„	73	*Unvaccinated*		Large pustules; abscesses.	19	—	2	2	2
34	H. J.	M.	8	„ 19	„ 11	„ 13	„ 17	„ 23	„	„	75	„		Delirium; abscesses	20	—	6	5	2
35	W. C.	M.	30	„ 16	„ 12	„ 15	„ 15	Jan. 10	Coherent	„	30	Infancy : 2 marks			—	—	—	—	—
36	W. R.	M.	36	„ 17	„ 12	„ 14	„ 17	„ 5	Mild	„	25	„ 3 „			17	—	—	—	—
37	E. P.	F.	25	„ 17	„ 15	„ 17	„ 15	„ 4	„	„	21	„ 3 „	Re-vaccinated (2 insertions) Dec. 15, 1892. Hospital nurse.	Eruption aborted	—	—	—	—	—
38	A. J. P.	M.	35	—	„ 15	„ 17	—	1892. Dec. 26	Discrete	„	12	„ ? „	Not notified		21	—	4	4	2
39	— L.	M.	1	1893. Jan. 2	„ 15	„ 15	—		Coherent	„	—	*Unvaccinated*			22	—	2	3	2
40	E. M.	F.	18	1892. Dec. 26	„ 20	„ 22	Dec. 24	1893. Jan. 28	Mild	„	40	Infancy : 3 marks		Menorrhagia	23	—	—	2	3
41	A. W.	F.	24	1893. Jan. 25	„ 23	?	1893. Jan. 25	Feb. 4	„	„	44	„ 2 „			24	—	2	2	—
42	F. S.	F.	22	1892. Dec. 30	„ 24	Dec. 26	„ 28	„ 28	Discrete	„	67	„ 2 „			25	—	1	3	—
43	G. L.	M.	4	1893. Jan. 1	„ 30	1893. Jan. 2	„ 2	„ 23	Coherent	„	56	*Unvaccinated*	Admission into Children's Hospital with convulsions, Jan. 1.	Abscesses	22	—	—	1	—
44	A. M. S.	F.	7	„ 3	„ 31	„ 2	„ 2	Jan. 16	Mild	„	17	Infancy : 4 marks		"Doubtful" case	19	—	—	—	—
45	N. H.	F.	12	„ 14	„ 31	„ 2	„ 12	Feb. 15	„	„	47	*Unvaccinated*	? Contracted from No.	Slight fever; tonsilitis.	26	—	2	5	2
46	C. G.	M.	24	„ 5	„ 31	„ 2	„ 3	Jan. 30	„	„	31	Infancy : 2 marks	Contracted at Halifax		27	—	3	4	2
47	F. L.	M.	25	„ 5	„ 31	„ 3	„ 5	March 11	Confluent	„	71	„ 3 „	Contracted at Chesterfield	Severe, but abortive	28	—	1	1	2
48	W. L.	M.	28	„ 6	1893. Jan. 1	„ 4	„ 5	Feb. 4	Mild	„	35	„ 2 „		Slight fever	22	—	—	—	—
49	A. B.	M.	15	„ 6	„ 1	„ 5	„ 8	„ 4	„	„	35	„ 3 „		Tonsilitis	29	—	—	4	2
50	E. H.	F.	21	„ 9	„ 2	„ 5	„ 7	Jan. 28	„	„	27	„ 3 „		No secondary fever	30	—	3	6	1
51	C. M.	F.	15	„ 5	„ 3	„ 5	„ 5	„ 28	„	„	26	„ ? „	Had slept with sister, No. 40, Dec. 19. Sent to quarantine Dec. 28.		23	—	—	—	—

TABLE OF CASES OF SMALL-POX—*cont.*

No.	Name.	Sex.	Age.	Notification.	Onset.	Rash.	Admission to Hospital.	Termination.	Type of Attack.	Result.	Duration in Days.	Vaccination Data.	Remarks.	Clinical Features of Attack.	Households. All Inmates.				
															Ref. No.	Under 1 Year.	1 to 10.	10 to 30.	30 Years upwards.
Col. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
52	E. M.	F.	36	1893. Jan. 8	1893. Jan. 3	1893. Jan. 7	1893. Jan. 8	1893. Feb. 1	Mild	Rec.	30	Infancy: ? marks	Had slept with sister, No. 40, Dec. 19. Sent to quarantine Dec. 28.		23	—	—	—	—
53	B. P.	F.	8	„ 9	„ 3	„ 5	„ 11	March 29	Confluent	„	86	*Unvaccinated*	Infected by No. 38	Abscesses	21	—	—	—	—
54	J. B.	F.	8	„ 8	„ 3	„ 6	„ 8	„ 29	„	„	86	„		Semi-malignant; hæmorrhage; high fever.	31	—	1	1	4
55	F. T.	M.	10	„ 23	„ 3	„ 5	„ 23	„ 11	Discrete	„	68	„	Not recognised at first		32	—	2	4	2
56	E. A.	M.	10	„ 7	„ 4	„ 6	„ 7	Feb. 23	„	„	51	„		Large pustules	33	—	1	2	1
57	A. P.	F.	13	„ 8	„ 4	„ 6	„ 8	„ 1	Mild	„	29	Infancy: 2 marks	Had nursed No. 43 when eruption on him.		34	—	3	3	2
58	J. M.	M.	19	„ 13	„ 4	„ 6	„ 13	„ 4	„	„	32	„ 4 „	About with rash out		35	—	—	6	2
59	J. S.	M.	5	„ 6	„ 4	„ 6	„ 6	March 15	Confluent	„	71	*Unvaccinated*		Nephritis; dropsy; tonsillitis.	19	—	—	—	—
60	E. M.	F.	28	„ 6	„ 5	„ 7	„ 8	Jan. 23	Mild	„	19	Infancy: 5 marks	Re-infected (*vide* No. 111)	No pyrexia; miscarriage.	36	—	4	1	1
61	E. P.	F.	5	„ 9	„ 5	„ 7	„ 10	Jan. 20	Confluent	Died	16	*Unvaccinated*	Infected by No. 38	Hæmorrhages. Double panopthalmitis.	21	—	—	—	—
62	B. K.	F.	26	„ 9	„ 5	„ 8	„ 8	Feb. 8	Mild	Rec.	32	Infancy: 4 marks	Wife of keeper of common lodging-house.		—	—	—	—	—
63	V. G.	F.	22	„ 11	„ 5	—	—	—	Discrete	„	—	„	Infected by No. 38		37	—	—	5	2
64	E. H.	F.	14	„ 13	„ 6	Jan. 9	Jan. 12	March 8	Confluent	„	62	*Unvaccinated*			26	—	—	—	—
65	C. W.	M.	1½	„ 25	„ 6	„ 10	„ 25	Feb. 4	Mild	„	30	„	Not attended by medical man		24	—	—	—	—
66	M. V.	F.	20	„ 10	„ 7	„ 9	„ 8	March 16	Discrete	„	69	Infancy: 4 marks	Wardmaid at hospital. Refused re-vaccination.		—	—	—	—	—
67	A. W.	F.	20	„ 11	„ 7	„ 9	„ 11	Feb. 1	Mild	„	26	„ 4 „	Infected by No. 38		21	—	—	—	—
68	F. F.	M.	29	„ 18	„ 7	„ 9	„ 18	„ 11	„	„	36	„ 2 „	Came from workhouse		—	—	—	—	—
69	J. W.	M.	13	„ 13	„ 7	„ 11	„ 13	March 11	Confluent	„	64	*Unvaccinated*			38	—	3	3	2
70	G. L.	M.	23	„ 10	„ 8	„ 9	„ 10	Feb. 25	Coherent	„	49	Infancy: 4 marks		Tonsilitis; phlebitis	39	—	—	4	—
71	J. W.	M.	5	„ 11	„ 8	„ 10	„ 11	March 3	„	„	55	*Unvaccinated*		Slight delirium	40	—	3	1	1
72	J. J. J.	M.	8	„ 29	„ 9	„ 11	„ 31	Feb. 15	Discrete	„	38	„	Not recognised when sent to quarantine, 28th Jan.; had stains of recent rash. Brother to No. 104.		41	—	3	3	1
73	S. C.	M.	5	„ 12	„ 9	„ 10	„ 12	March 8	Coherent	„	59	„		Abscess; slight fever	42	—	4	—	3.
74	E. B.	F.	17	„ 14	„ 9	„ 12	„ 15	Feb. 1	Mild	„	24	Infancy: 3 marks			43	—	4	5	2
75	T. H.	M.	21	„ 23	„ 9	?	—	—	Discrete	„	—	„ 3 „	Treated at home. Not discovered for 3 weeks.		44	—	1	6	
76	G. H.	M.	26	„ 13	„ 9	„ 11	Jan. 13	Feb. 4	Mild	„	27	„ 4 „			45	1	2	2	1
77	M. J.	F.	13	Feb. 5	„ 10	„ 12	—	—	Discrete	„	—	*Unvaccinated*	Not notified at first. Isolated at home. Home under observation till December 31.		20	—	—	—	—

TABLE OF CASES OF SMALL-POX—*cont.*

No.	Name.	Sex	Age.	Notification.	Onset.	Rash.	Admission to Hospital.	Termination.	Type of Attack.	Result.	Duration in Days.	Vaccination Data.	Remarks.	Clinical Features of Attack.	Households. All Inmates.				
															Ref. No.	Under 1 Year.	1 to 10.	10 to 30.	30 Years upwards.
Col. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
78	G. S.	M.	50	1893. Jan. 18	1893. Jan. 12	1893. Jan. 14	1893. Jan. 18	1893. Feb. 4	Mild	Rec.	27	Infancy: 3 marks	Had maturated before admission		—	—	—	—	—
79	W. P. P.	M.	30	„ 13	„ 12	—	—	—	„	„	—				46	—	1	3	1
80	G. G.	M.	44	„ 18	„ 13	„ 15	Jan. 17	Feb. 20	„	„	39	Infancy: 3 marks		Spots fading 19 Jan.	47	—	—	—	—
81	A. B.	F.	24	„ 18	„ 15	„ 17	„ 18	„ 18	„	„	35	„ 4 „	Re-vaccinated unsuccessfully Jan. 9	About 6 papules	29	—	—	—	—
82	R. H.	F.	5	„ 18	„ 16	„ 18	„ 18	March 8	Coherent	„	52	*Unvaccinated*	Sent to quarantine 12th Jan.		26	—	—	—	—
83	C. M.	M.	20	„ 22	„ 16	„ 18	„ 22	Feb. 20	Mild	„	36	Infancy: 5 marks			48	—	—	2	1
84	H. M.	F.	30	„ 20	„ 17	„ 19	„ 19	March 8	Coherent	„	51	„ 6 „	Sister to F. L., No. 47	Severe, but did not pustulate.	28	—	—	—	—
85	E. H.	F.	10	„ 18	„ 17	„ 19	„ 20	Feb. 23	„	„	38	*Unvaccinated*	Sent to quarantine 12th Jan.		26	—	—	—	—
86	R. H.	M.	20	„ 23	„ 17	„ 19	„ 23	„ 23	Discrete	„	38	Infancy: 3 marks		Developed scarlet fever, 26th Jan.	49	—	1	6	2
87	A. H.	F.	17	„ 18	„ 17	„ 19	„ 19	March 8	Coherent	„	51	*Unvaccinated*	Sent to quarantine 12th Jan.	Large bullæ	26	—	—	—	—
88	L. C.	M.	8	„ 25	„ 17	„ 19	„ 24	April 15	Confluent	„	89	„		Delirium; abscesses	50	—	3	3	2
89	H. A.	M.	7	„ 20	„ 18	„ 20	„ 20	„ 29	Coherent	„	102	„	Desquamating (scarlet fever) on admission.	Slight delirium	33	—	—	—	—
90	G. R. T.	M.	21	„ 23	„ 18	„ 20	„ 23	Feb. 11	Mild	„	25	Infancy: 2 marks	Infected by brother, No. 55		32	—	—	—	—
91	M. T.	F.	16	„ 23	„ 18	„ 20	„ 23	April 20	Mild	„	93	„ 2 „	Infected by No. 55	Mammary abscess	32	—	—	—	—
92	S. M.	M.	52	„ 22	„ 19	„ 21	„ 22	March 11	Coherent	„	52	„ 6 „	Infected by No. 51. In quarantine 5th to 12th Jan.		23	—	—	—	—
93	N. T.	M.	4	„ 23	„ 19	„ 21	„ 23	April 20	Confluent	„	72	*Unvaccinated*	Infected by brother, No. 55		32	—	—	—	—
94	M. N.	F.	41	„ 21	„ 19	„ 21	„ 21	March 8	Discrete (severe)	„	49	Infancy: 3 marks	Attended on Nos. 53, 57, 61	Marked eruption; course mild.	21	—	—	—	—
95	A. H.	F.	9 months.	„ 21	„ 19	—	—	Jan. 20	Malignant	Died	2	*Unvaccinated*	Died after 24 hours' attack		51	1	—	3	—
96	E. W.	M.	2¼	„ 25	„ 20	„ 23	„ 25	May 2	Confluent	Rec.	103	„		Very severe	24	—	—	—	—
97	E. B.	F.	7	„ 21	„ 20	„ 21	„ 21	Feb. 23	Mild	„	35	„			52	1	3	3	2
98	J. W.	M.	28	„ 25	„ 20	„ 22	„ 25	„ 11	„	„	23	Infancy: 5 marks	Infected by his child, No. 65		24	—	—	—	—
99	W. J.	M.	61	„ 27	„ 21	„ 23	„ 27	„ 20	„	„	31	„ 6 „ Re-vaccinated 1852.		About six papules	—	—	—	—	—
100	A. W.	M.	17	„ 25	„ 22	„ 24	„ 25	March 11	„	„	49	Infancy: 4 marks			53	—	1	4	2
101	L. T.	F.	7	„ 24	„ 22	„ 24	„ 24	April 20	Discrete	„	89	*Unvaccinated*	Sister to No. 93	Slight fever	32	—	—	—	—
102	C. B.	M.	31	„ 25	„ 22	„ 24	„ 25	Feb. 22	Mild	„	32	Infancy: 4 marks. Revaccinated 1885.		Rapid subsidence	54	—	4	2	1
103	J. P.	M.	33	„ 26	„ 22	„ 24	„ 25	March 11	Coherent	„	49	Infancy: 3 marks		Slight fever; conjunctivitis; iritis.	55	1	2	1	1
104	C. J.	F.	5	„ 29	„ 23	„ 25	„ 28	April 6	Discrete	„	74	*Unvaccinated*	Sister to 72	Sloughing phenyitis	41	—	—	—	—
105	A. G.	F.	12	„ 26	„ 23	„ 25	„ 26	March 15	Confluent	„	52	„		Hæmatemesis; epistaxis; fever.	56	—	—	1	1

Table of Cases of Small-pox—*cont.*

No.	Name.	Sex.	Age.	Notification.	Onset.	Rash.	Admission to Hospital.	Termination.	Type of Attack.	Result.	Duration in Days.	Vaccination Data.	Remarks.	Clinical Features of Attack.	Households. All Inmates.				
															Ref. No.	Under 1 Year.	1 to 10.	10 to 30.	30 Years upwards.
Col. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
106	E. W.	F.	40	1893. Jan. 23	1893. Jan. 23	1893. Jan. 25	1893. Jan. 25	1893. Feb. 22	Mild	Rec.	31	Infancy: 3 marks. Re-vaccinated ten years ago.	Nursed No. 60 at hospital		—	—	—	—	—
107	T. H. W.	M.	21	„ 28	„ 26	„ 28	„ 28	„ 20	„	„	26	Infancy: 3 marks			—	—	—	—	—
108	A. P.	F.	14	„ 30	„ 27	„ 29	Feb. 1	March 15	„	„	48	„ 4 „		Complicated with otorrhea and symptoms of meningitis.	57	—	—	3	2
109	J. S.	M.	70	Feb. 4	„ 28	Feb. 1	„ 3	April 4	„	„	67	„ 4 „		Bronchitis	58	—	2	2	2
110	F. E. H.	F.	4	„ 3	„ 28	Jan. 31	„ 3	Feb. 8	Confluent	Died	12	*Unvaccinated*		Panopthalmitis	59	1	2	1	1
111	E. M.	F.	28	Jan. 30	„ 28	„ 30	Jan. 30	March 2	Discrete	Rec.	34	Infancy: 5 marks	No. 60 re-admitted	Well matured pustules on face.	36	—	—	—	—
112	J. R.	M.	29	„ 30	„ 28	„ 30	„ 30	„ 23	Confluent	„	55	„ 2 „		Alcoholic; erysipelas	—	—	—	—	—
113	A. P.	F.	24	Feb. 2	„ 29	Feb. 1	Feb. 1	„ 4	Mild	„	35	„ 2 „			60	1	7	8	3
114	N. J.	M.	5	„ 5	„ 30	„ 1	„ 4	„ 9	Confluent	Died	9	*Unvaccinated*		Dusky red rash	20	—	—	—	—
115	A. W.	F.	22	„ 9	„ 31	„ 2	„ 4	March 29	Discrete	Rec.	56	Infancy: 2 marks			61	—	—	2	—
116	W. K.	M.	28	„ 4	„ 31	„ 2	„ 4	„ 4	Mild	„	31	„ 3 „	Engaged on work at hospital 14th April.	Tonsilitis 7th Feb.	62	—	1	2	—
117	J. P.	M.	50	„ 4	„ 31	„ 2	„ 4	„ 11	Discrete	„	33	„ 4 „		Rash abundant on face and throat.	64	—	—	5	1
118	H. B.	M.	25	„ 4	Feb. 1	„ 3	„ 4	„ 4	Mild	„	32	Infancy: Re-vaccinated 2 years ago.		About six papules	—	—	—	—	—
119	M. C.	M.	16	„ 4	„ 2	„ 4	„ 4	Feb. 25	„	„	24	Infancy: 4 marks	Infected by No. 88		50	—	—	—	—
120	J. B.	M.	30	„ 9	„ 3	„ 6	„ 8	March 4	„	„	30	„ 5 „			63	1	2	1	1
121	B. G.	M.	7	„ 14	„ 4	„ 7	„ 11	April 27	Confluent	„	83	*Unvaccinated*		Abscesses	65	—	4	1	2
122	E. J.	F.	4	„ 8	„ 4	„ 6	„ 7	„ 27	Coherent	„	83	„		„	20	—	—	—	—
123	E. J.	M.	15	„ 8	„ 4	„ 6	„ 7	„ 6	„	„	62	„		„	20	—	—	—	—
124	L. C.	M.	35	„ 6	„ 4	„ 6	„ 6	Feb. 25	Mild	„	22	Infancy: 1 mark	Father to 88 and 119		50	—	—	—	—
125	A. L.	M.	48	„ 10	„ 6	„ 8	„ 9	March 4	„	„	27	„ 2 marks		Bronchitis	—	—	—	—	—
126	H. S.	F.	21	„ 11	„ 9	„ 11	„ 11	„ 2	„	„	22	„ 5 „	Infected by 104		41	—	—	—	—
127	M. S.	F.	33	„ 17	„ 11	„ 13	„ 17	„ 15	Discrete	„	33	„ 6 „	From Mansfield 11th Feb.		66	—	1	1	4
128	M. E. J.	F.	6	„ 17	„ 12	„ 14	„ 16	„ 29	Coherent	„	46	*Unvaccinated*		Abscesses	20	—	—	—	—
129	W. B.	M.	7	„ 17	„ 12	„ 14	„ 16	April 6	Confluent	„	54	„	? Infected in Sunday school	„	67	—	4	1	2
130	A. H.	F.	26	„ 18	„ 16	„ 18	„ 18	March 15	Mild	„	28	Infancy: 3 marks		Tonsilitis	59	—	—	—	—
131	N. G.	F.	5	„ 18	„ 16	„ 17	„ 18	April 20	Confluent	„	64	*Unvaccinated*		Abscesses	65	—	—	—	—
132	J. U.	M.	52	„ 27	„ 16	„ 18	„ 25	March 23	Mild	„	36	Infancy: 3 marks. Re-vaccinated 30 years.	For a week at C. L. H. with rash out		—	—	—	—	—

TABLE OF CASES OF SMALL-POX—*cont.*

No.	Name.	Sex.	Age.	Notification.	Onset.	Rash.	Admission to Hospital.	Termination.	Type of Attack.	Result.	Duration in Days.	Vaccination Data.	Remarks.	Clinical Features of Attack.	Households. All Inmates.				
															Ref. No.	Under 1 Year.	1 to 10.	10 to 30.	30 Years upwards.
Col. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
133	J. T.	M.	2	1893. Feb. 25	1893. Feb. 18	1893. Feb. 21	1893. Feb. 23	1893. April 1	Coherent	Rec.	43	*Unvaccinated*		Bronchitis; pertussis	68	—	1	1	1
134	G. H.	M.	29	—	" 21	" 23	—	—	Mild	"	—	Infancy: 3 marks	Not recognised. At home		69	—	2	2	1
135	S. H.	F.	26	March 1	" 25	" 27	Feb. 27	May 9	Confluent	"	74	*Unvaccinated*		Severe delirium	70	—	3	2	—
136	T. B.	M.	44	" 2	" 27	March 1	March 2	March 25	Discrete	"	27	Infancy: 2 marks	Father to 129		67	—	—	—	—
137	M. R.	M.	31	" 3	March 1	" 3	" 3	May 10	Confluent	"	71	" 2 "	At Northampton 15th Feb.		71	—	—	—	—
138	E. S.	F.	7	" 8	" 1	" 3	" 6	April 29	Mild	"	60	*Unvaccinated*		Developed scarlet fever 17th March.	72	1	3	—	2
139	J. W.	M.	29	" 7	" 2	" 6	" 6	" 22	Coherent	"	52	Infancy: 3 marks	Infected at Tipshelf, near Sheffield		73	—	3	5	2
140	J. C.	M.	26	" 7	" 3	" 6	" 6	" 18	Discrete	"	47	" "	Do. do. do.		73	—	—	—	—
141	G. T. H.	M.	39	" 11	" 5	" 7	" 11	" 6	"	"	33	" 5 "		Conjunctivitis	—	—	—	—	—
142	G. B.	M.	45	" 13	" 5	" 8	" 11	" 1	Mild	"	28	" 3 "			—	—	—	—	—
143	W. T.	M.	32	" 10	" 7	" 9	" 10	" 1	"	"	26	" 4 "			68	—	—	—	—
144	J. H. G.	M.	29	" 11	" 8	" 10	" 10	" 29	Coherent	"	53	" 3 "			—	—	—	—	—
145	J. F.	M.	48	" 14	" 8	" 10	" 10	" 1	Discrete	"	25	" 6 "		Slight fever	—	—	—	—	—
146	J. C.	M.	64	" 14	" 9	" 11	" 11	" 14	"	"	37	" 3 "		Delirium tremens	—	—	—	—	—
147	F. H.	M.	4	—	" 11	?	—	—	"	"	—	*Unvaccinated*	All at home infected by 134		69	—	—	—	—
148	A. H.	F.	29	—	" 13	?	—	—	Mild	"	—	Infancy: 4 marks			69	—	—	—	—
149	C. P.	F.	16	—	" 19	?	—	—	"	"	—	Infancy			74	—	—	4	2
150	W. S.	M.	26	March 24	" 21	March 23	March 23	April 18	"	"	29	Infancy: 4 marks			75	—	1	7	2
151	B. F.	M.	62	" 29	" 22	" 24	" 24	" 18	Discrete	"	28	" 2 "			—	—	—	—	—
152	G. H.	M.	1	—	" 22	—	—	—	"	"	—	*Unvaccinated*	At home; infected by 134		69	—	—	—	—
153	J. W.	M.	30	—	" 22	—	—	—	Mild	"	—	Infancy			69	—	—	—	—
154	J. F.	M.	27	March 30	" 24	March 26	March 30	April 18	"	"	26	Infancy: 5 marks			—	—	—	—	—
155	W. H.	M.	28	" 30	" 26	" 28	" 29	" 27	Confluent	"	33	*Unvaccinated*			70	—	—	—	—
156	F. P.	M.	23	—	" 26	—	—	—	Mild	"	—	Infancy	At home; infected by 134		74	—	—	—	—
157	E. B.	M.	35	April 3	" 27	March 29	April 3	April 29	Discrete	"	34	Infancy: 3 marks			76	—	3	1	1
158	H. B	F.	21	" 16	" 27	" 29	" 17	" 18	Mild	"	23	" 4 "	Infected by 134		77	—	1	4	3
159	M. W.	F.	33	" 2	" 28	" 30	" 1	" 27	"	"	31	" 2 "			78	—	4	1	2
160	F. W	F.	30	" 2	" 29	" 31	March 31	May 9	Discrete	"	42	" 2 "	? infected 15th March at hospital gate	Phlyctenula	70	—	1	1	2

TABLE OF CASES OF SMALL-POX—*cont.*

No.	Name.	Sex.	Age.	Notification.	Onset.	Rash.	Admission to Hospital.	Termination.	Type of Attack.	Result.	Duration in Days.	Vaccination Data.	Remarks.	Clinical Features of Attack.	Households. All Inmates.				
															Ref. No.	Under 1 Year.	1 to 10.	10 to 30.	30 Years upwards.
Col. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
161	E. P.	F.	45	1893. April 14	1893. April 2	1893. —	1893. —	1893. —	Mild	Rec.	—	Infancy	At home, 134; mother of 149 and 156		74	—	—	—	—
162	J. H.	M.	39	May 9	" 2	April 4	May 9	May 13	Coherent	"	42	" 2 marks	Not medically attended, but in bed 3 weeks.		80	—	1	1	1
163	H. H.	M.	9	April 8	" 3	" 5	April 9	" 25	"	"	53	*Unvaccinated*	? infected at school		81	—	3	2	1
164	T. B.	M.	29	" 22	" 3	—	—	—	Mild	"	—	Infancy: 4 marks			82	—	3	2	—
165	E. G.	F.	45	" 15	" 4	—	—	—	"	"	—	"			83	1	3	—	3
166	E. M.	F.	21	" 21	" 5	April 7	—	—	"	"	—	" 4 marks	Not notified at first		84	—	2	6	2
167	J. A.	M.	22	" 14	" 7	" 9	April 13	May 2	"	"	26	" 2 "	Infected by "T. S." a navvy	About 6 spots	85	—	—	2	3
168	L. B.	F.	8	" 14	" 8	" 10	" 12	" 9	Coherent	"	32	*Unvaccinated*	Sister to No. 158		77	—	—	—	—
169	F. H.	M.	35	" 14	" 10	" 12	" 13	" 20	Discrete	"	41	Infancy: 3 marks	Infected by "T. S."		85	—	—	—	—
170	M. H.	F.	29	" 14	" 10	" 12	" 15	" 6	"	"	27	" 2 "			85	—	—	—	—
171	A. M.	F.	10	" 16	" 10	" 12	" 16	" 13	Mild	"	34	*Unvaccinated*	Grandchildren to 161	Mild attacks	86	1	2	1	2
172	F. M.	F.	8	" 16	" 10	" 12	" 16	" 13	Discrete	"	34	"			86	—	—	—	—
173	J. G.	M.	7 months.	" 15	" 10	" 12	" 14	" 20	Coherent	"	41	"		Spinal abscess	83	—	—	—	—
174	N. G.	F.	7 years.	" 15	" 10	" 12	" 14	June 27	Confluent	"	79	"		Hæmorrhagic rash; severe pitting; abscesses.	83	—	—	—	—
175	J. M.	F.	28	—	" 10	—	—	—	Mild	"	—	Infancy	Thought to have "influenza"		87	1	1	2	1
176	N. B.	M.	33	April 14	" 11	April 13	April 14	May 10	Discrete	"	30	" 3 marks	Connected with 156, &c.		88	1	1	1	1
177	E. B.	F.	16	" 16	" 12	" 14	" 15	" 9	"	"	28	" 4 "			77	—	—	—	—
178	A. M.	F.	29	" 16	" 13	" 15	" 16	" 25	Coherent	"	43	*Unvaccinated*	An equivocal scar on left arm. Infected by "T. S."		89	—	3	1	2
179	T. G.	M.	49	" 17	" 14	" 16	" 17	" 10	Mild	"	27	Infancy: 3 marks; revaccinated 1887, *nil.*	Connected with 134, &c.		83	—	—	—	—
180	G. B.	M.	33	" 19	" 14	" 16	" 19	" 10	Discrete	"	27	Infancy: 3 marks	Infected by "T. S."		90	—	4	1	2
181	W. D.	M.	20	" 21	" 16	" 18	" 19	July 1	Confluent	Rec.	77	Infancy: 1 mark	? Infected at athletic sports, 2nd April.	Abscesses; iritis	91	—	1	6	2
182	B. M.	F.	9	" 21	" 16	" 18	" 22	April 24	Malignant	Died	9	*Unvaccinated*	Sister to 166	Hæmorrhages all over body. Pulm. œdema.	84	—	—	—	—
183	L. B.	F.	3½	" 22	" 17	" 19	" 20	June 8	Discrete	Rec.	53	"	From father, who shows recent stains.	Ecthyma, 30th May	82	—	—	—	—
184	J. S.	M.	16	" 23	" 17	" 19	" 21	May 30	Confluent	"	44	"		Abscesses; severe pitting.	92	—	—	1	2
185	R. H.	M.	11	" 23	" 19	" 21	" 22	April 25	Malignant	Died	7	"	Infected by brother, 163	Hæmatemesis; epistaxis.	81	—	—	—	—
186	M. A. L.	F.	25	" 28	" 19	" 21	" 24	May 13	Mild	Rec.	25	Infancy: 4 marks	Probably by 166	Maturating on admission.	84	—	—	—	—
187	E. M.	M.	6	" 23	" 20	" 22	" 22	" 31	Coherent	"	42	*Unvaccinated*	Infected by sister, 166	Abscesses; severe pitting.	84	—	—	—	—
188	H. L.	M.	3½	" 29	" 23	" 26	" 28	June 8	"	"	47	"		Slight fever and pitting.	93	—	3	—	2

TABLE OF CASES OF SMALL-POX—*cont.*

No.	Name.	Sex.	Age.	Notification.	Onset.	Rash.	Admission to Hospital.	Termination.	Type of Attack.	Result.	Duration in Days.	Vaccination Data.	Remarks.	Clinical Features of Attack.	Households. All Inmates. Ref. No.	Under 1 Year.	1 to 10.	10 to 30.	30 Years upwards.
Col. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
189	E. M.	F.	34	1893. April 28	1893. April 23	1893. April 25	1893. April 27	1893. May 25	Discrete	Rec.	33	Infancy: 3 marks	Mother to 171 and 172	About 6 papules	86	—	—	—	—
190	M. G.	F.	8	„ 29	„ 24	„ 26	„ 28	June 8	„	„	46	April 19, 1893: 3 vesicles.	Sister to 174	Very mild	83	—	—	—	—
191	H. B.	M.	13	May 2	„ 25	„ 27	„ 27	„ 10	Coherent	„	47	*Unvaccinated*	? Infected by calling at 162's house	Abscesses	94	—	3	3	2
192	S. B.	F.	56	—	„ 25	—	—	—	Mild	„	—	Infancy	Probably infected by daughter, 175	-	95	—	—	6	2
193	L. M.	F.	3	May 2	„ 26	„ 28	May 2	May 25	Confluent	„	30	*Unvaccinated*	Child of 189	Abscesses; phthisis	86	—	—	—	—
194	G. B.	M.	16 months.	„ 1	„ 26	„ 28	April 29	„ 17	„	Died	22	„	Infected by father, 180	Double panopthalmitis; gangrene of legs.	90	—	—	—	—
195	E. B.	F.	18	„ 1	„ 27	„ 29	May 1	June 23	„	Rec.	58	„	Infected in country	Dusky rash; abscesses; severe pitting.	96	—	—	2	2
196	B. S.	F.	2	„ 9	„ 28	May 1	„ 9	„ 8	Coherent	„	42	„	Infected by father at T.	Abscesses	97	—	1	4	2
197	B. B.	F.	5	„ 3	„ 29	„ 1	„ 2	„ 25	Mild	„	58	„	-	About 6 papules	82	—	—	—	—
198	L. B.	F.	3	„ 3	„ 30	„ 2	„ 2	„ 27	Confluent	Died	58	„	Infected by father, 180	Panophthalmitis; phagedæna of face.	90	—	—	—	—
199	E. H.	M.	16	„ 3	„ 30	„ 2	„ 3	„ 10	Discrete	Rec.	42	„	-	-	98	—	2	4	3
200	A. S.	F.	23	„ 5	May 1	„ 3	„ 2	May 15	Mild	„	15	Infancy: 4 marks	Wardmaid at Hospital. Not re-vaccinated.	About 6 papules; hysteria.	—	—	—	—	—
201	A. M.	F.	22	„ 8	„ 2	„ 4	„ 6	„ 31	„	„	30	„ 2 „	At work with 166	About 6 papules	99	—	3	8	2
202	E. H.	F.	36	„ 8	„ 3	„ 5	„ 6	June 20	Coherent	„	49	„ 3 „	? Infected at 162's house	-	100	—	—	1	2
203	A. G.	M.	26	„ 10	„ 5	„ 7	„ 10	„ 3	Discrete	„	30	„ 3 „	Assisted at burial of 182	? Inoculated	101	1	—	2	2
204	J. B.	M.	60	June 3	„ 6	„ 8	June 3	„ 17	„	„	43	„ 2 „	Husband to 192	Not diagnosed when ill.	95	—	—	—	—
205	T. B.	M.	40	May 18	„ 8	„ 10	May 16	May 30	Mild	„	23	„ 3 „	-	Maturating on admission.	102	—	1	4	2
206	W. T.	M.	50	„ 15	„ 8	„ 10	„ 15	June 3	„	„	27	„ 3 „	-	-	103	—	—	1	2
207	H. W.	M.	23	„ 12	„ 8	„ 10	„ 11	„ 17	Coherent	„	41	„ 3 „	? Infected through "T. S."	-	104	—	—	7	2
208	W. V.	M.	6	„ 17	„ 10	„ 12	„ 15	„ 20	Confluent	„	42	*Unvaccinated*	? Infected by 196	Abscesses; corneal ulcer.	105	—	2	3	2
209	J. B.	M.	10	„ 14	„ 10	„ 12	„ 12	„ 23	Coherent	„	45	„	Infected by brother, 191	Abscesses; pitting	94	—	—	—	—
210	G. C.	M.	34	„ 16	„ 10	„ 12	„ 15	„ 3	Mild	„	25	Infancy: 3 marks	Assisted No. 203	Maturating on admission. About 6 pustules.	106	—	3	—	2
211	H. W.	M.	17	„ 15	„ 10	„ 12	„ 13	July 5	Confluent	„	57	*Unvaccinated*	? Infected at Sunday school	Abscesses; severe pitting.	107	—	—	2	2
212	C. M.	M.	7	„ 18	„ 11	„ 13	„ 17	June 30	Coherent	„	51	„	Not traced	-	108	—	4	1	2
213	K. G.	F.	10	„ 17	„ 11	„ 13	„ 16	„ 23	Discrete	„	44	„	-	-	109	1	1	2	4
214	A. G.	F.	5	„ 17	„ 11	„ 13	„ 17	„ 17	„	„	38	„	-	Diagnosis "doubtful." Placed in separate ward.	110	—	2	3	2
215	A. P.	M.	16	„ 16	„ 11	„ 13	„ 15	„ 28	Confluent	„	49	„	-	Abscesses	111	—	3	4	2

TABLE OF CASES OF SMALL-POX—*cont.*

No.	Name.	Sex.	Age.	Notification.	Onset.	Rash.	Admission to Hospital.	Termination.	Type of Attack.	Result.	Duration in Days.	Vaccination Data.	Remarks.	Clinical Features of Attack.	Households. All Inmates.				
															Ref. No.	Under 1 Year.	1 to 10.	10 to 30.	30 Years upwards.
Col. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
216	J. W.	M.	5	1893. May 17	1893. May 11	1893. May 13	1893. May 16	1893. June 8	Mild	Rec.	29	*Unvaccinated*	Desquamating from scarlet fever on admission.	- - -	112	—	3	1	2
217	H. S.	M.	37	„ 16	„ 13	„ 15	„ 16	„ 28	Confluent	„	47	Infancy: 3 marks	"T. S." lodged with him, 24th April to 15th May.	Broncho-pneumonia; delirium tremens.	104	—	—	—	—
218	W. B.	M.	6	„ 16	„ 13	„ 15	„ 15	„ 23	Discrete	„	42	*Unvaccinated*	Brother to 191	Abscesses	94	—	—	—	—
219	W. S.	M.	16	„ 20	„ 17	„ 19	„ 20	„ 28	Mild	„	43	May 16th, 1893: 2 vesicles.	- - -	„	104	—	—	—	—
220	W. H.	M.	44	„ 22	„ 17	„ 19	„ 20	„ 3	„	„	18	Infancy: 2 marks	Father to 199	- - -	98	—	—	—	—
221	A. H.	F.	21	„ 27	„ 18	„ 20	„ 26	„ 8	„	„	22	„ 1 „	Probably infected by nurse from scarlet fever hospital.	A few papules	113	—	—	6	1
222	E. S.	F.	16	„ 23	„ 19	„ 21	„ 22	„ 30	Confluent	„	43	*Unvaccinated*	From 196, her niece	Abscesses; deep pitting.	97	—	—	—	—
223	J. S.	M.	12	„ 23	„ 19	„ 21	„ 22	July 5	Coherent	„	48	„	- - -	- - -	97	—	—	—	—
224	W. B.	M.	12	„ 24	„ 20	„ 22	„ 23	June 24	Confluent	„	36	„	- - -	- - -	114	—	5	3	2
225	F. J.	M.	5	„ 27	„ 20	„ 22	„ 26	July 4	„	„	46	„	Newfoundpool case	Dysenteric attack; abscesses.	115	—	4	2	2
226	M. H.	F.	7	„ 29	„ 21	„ 23	„ 29	June 20	Discrete, m.	„	31	„	Not traced	- - -	116	1	2	2	2
227	S. M.	F.	37	„ 29	„ 21	„ 23	„ 29	„ 16	Mild	„	27	Infancy: 4	„	Very mild	117	—	1	4	5
228	A. G.	F.	12	June 1	„ 24	„ 26	„ 31	July 4	Confluent	„	42	*Unvaccinated*	Probably infected at inn at T.	Abscesses	118	—	2	1	3
229	S. D.	F.	24	„ 18	„ 24	—	—	—	Mild	„	—	Infancy: 4 marks	Thought to be varicella	- - -	119	—	—	2	—
230	E. W.	F.	30	„ 2	„ 25	May 27	June 1	July 4	Discrete, m.	„	41	„ „	- - -	About 6 papules	120	—	3	—	2
231	J. H. H.	M.	11	„ 2	„ 26	„ 28	„ 1	„ 8	Mild	„	44	„ „	- - -	- - -	121	—	4	1	2
232	L. P.	F.	8	„ 2	„ 27	„ 29	„ 3	„ 4	Confluent	„	39	*Unvaccinated*	Not traced	- - -	122	—	1	2	3
233	R. H.	M.	8	„ 2	„ 27	„ 29	„ 2	„ 4	Coherent	„	39	„	Probably infected by 213	- - -	123	—	4	—	4
234	S. P.	M.	42	„ 2	„ 27	„ 29	May 31	„ 28	Confluent	„	63	„	Probably infected at S. Wigston	High fever; dolirium; abscesses.	124	—	1	5	2
235	J. W. S.	M.	39	„ 3	„ 27	„ 29	June 2	„ 5	Discrete	„	40	Infancy: 3 marks	„ „	- - -	125	—	—	2	3
236	J. N.	M.	28	„ 1	„ 28	„ 30	May 31	June 8	Malignant	Died	12	*Unvaccinated*	? At Sewer Works	Hæmorrhages	126	1	2	5	1
237	J. M.	M.	25	„ 2	„ 28	„ 30	June 1	July 14	Coherent	Rec.	48	At 10 years: 5 marks	- - -	Abscesses; marked pits.	87	—	—	—	—
238	E. G.	M.	4 months.	„ 8	„ 29	„ 31	„ 2	June 23	„	„	26	*Unvaccinated*	From sister 213	Pertussis. Slight pitting.	109	—	—	—	—
239	E. C.	F.	10	„ 2	„ 29	„ 31	„ 1	July 4	„	„	37	„	Probably by 212	- - -	127	1	2	3	2
240	J. W.	M.	30	„ 3	„ 30	June 1	„ 2	June 17	Discrete, m.	„	19	Infancy: 2 marks	By son, 216	About 12 papules	112	—	—	—	—
241	G. W. R.	M.	21	—	„ 30	May 31	—	„ 8	„ m.	„	—	„ 4 „	Thought to be varicella	- - -	128	—	3	4	2
242	N. H.	F.	19	June 5	„ 31	June 2	June 3	„ 27	„ m.	„	28	„ 5 „	Not traced	About 12 papules	129	—	—	3	2
243	A. G.	F.	52	„ 5	June 1	„ 3	„ 6	„ 30	Coherent	„	30	„ 3 „	Infected by 204	- - -	130	—	—	2	2

TABLE OF CASES OF SMALL-POX—*cont.*

No.	Name.	Sex.	Age.	Notification.	Onset.	Rash.	Admission to Hospital.	Termination.	Type of Attack.	Result.	Duration in Days.	Vaccination Data.	Remarks.	Clinical Features of Attack.	Households. All Inmates.				
															Ref. No.	Under 1 Year.	1 to 10.	10 to 30.	30 Years upwards.
Col. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
244	R. H.	M.	48	1893. June 6	1893. June 1	1893. June 3	1893. June 6	1893. July 14	Confluent	Rec.	44	Infancy: 3 marks	By daughter, 221	Delirium tremens; albuminuria.	113	—	—	—	—
245	E. H.	F.	18	„ 6	„ 2	—	—	—	Mild	„	—	„ 3 „	Same family as 221		113	—	—	—	—
246	E. H.	F.	16	„ 6	„ 4	June 6	June 6	June 20	„	„	17	„ 3 „			113	—	—	—	—
247	G. H.	M.	13	„ 10	„ 4	„ 6	„ 9	„ 24	„	„	21	„ 4 „		About 6 papules	113	—	—	—	—
248	P. H.	M.	15	„ 15	„ 4	—	—	—	„	„	—	„ 2 „			113	—	—	—	—
249	A. A.	F.	27	„ 12	„ 7	June 9	June 11	June 30	Discrete	„	24	„ 5 „	Infected by 227		131	—	3	2	1
250	G. P.	F.	14	„ 11	„ 7	„ 9	„ 11	„ 27	Mild	„	21	„ 1 „	Visited H. family (204, &c.) on 25th May.	About 6 papules	132	—	2	2	2
251	W. A.	M.	28	„ 14	„ 8	„ 10	„ 12	July 22	Coherent	„	45	*Unvaccinated*	Work with 220		133	—	2	2	—
252	N. W.	M.	5	„ 12	„ 8	„ 10	„ 12	„ 18	Discrete	„	41	„	Infected by mother, 230	Abscesses; slight pitting.	120	—	—	—	—
253	W. W.	M.	34	„ 12	„ 9	„ 11	„ 12	„ 1	„ m.	„	23	Infancy: 3 marks	By wife, 230	About 6 papules	120	—	—	—	—
254	T. R. R.	M.	20	„ 15	„ 10	„ 12	„ 14	Aug. 9	Confluent	„	61	*Unvaccinated*		Dusky rash; abscesses	134	—	1	6	2
255	G. D.	M.	24	„ 18	„ 10	„ 12	„ 17	July 1	Mild	„	22	Infancy: 4 marks	Husband to 229	About 6 papules	119	—	—	—	—
256	E. B.	F.	17	„ 14	„ 11	„ 13	„ 13	„ 15	Confluent	„	35	„ 3 „			135	—	4	4	3
257	K. R.	F.	14	„ 17	„ 11	„ 13	„ 15	„ 4	Discrete	„	24	„ 1 „	Sister to 241		128	—	—	—	—
258	A. E. M.	F.	18 months.	„ 14	„ 11	„ 13	„ 13	Aug. 8	Confluent	„	59	*Unvaccinated*	Infected by father, 237		87	—	—	—	—
259	E. W.	F.	34	„ 18	„ 12	„ 14	„ 16	July 7	Discrete	„	26	Infancy	Newfoundpool case		136	—	1	1	2
260	C. B.	M.	10	„ 15	„ 12	„ 14	„ 15	„ 22	Coherent	„	41	*Unvaccinated*	Notified as scarlet fever	Abscesses	137	—	2	3	1
261	E. W.	F.	3½	„ 15	„ 12	„ 14	„ 15	„ 18	Confluent	„	37	„		Laryngitis; otitis; abscesses.	120	—	—	—	—
262	A. R.	F.	2	„ 17	„ 13	„ 15	„ 16	Aug. 8	„	„	57	„	Sisters to 241	Abscesses	128	—	—	—	—
263	E. R.	F.	21	„ 21	„ 13	„ 15	„ 19	July 4	Mild	„	22	Infancy: 4 marks		Very mild	128	—	—	—	—
264	G. C.	M.	3	„ 17	„ 13	„ 15	„ 17	„ 20	Discrete	„	38	*Unvaccinated*	Brother to 228		127	—	—	—	—
265	W. B.	M.	13	„ 17	„ 13	„ 15	„ 16	Aug. 1	Confluent	„	50	„	? Infected by visit to 253	Abscesses	135	—	—	—	—
266	E. B.	F.	7	„ 17	„ 13	„ 15	„ 17	July 25	„	„	43	„		„	138	—	1	2	1
267	H. R.	M.	8	„ 20	„ 14	„ 16	„ 19	„ 4	Mild	„	21	Infancy: 4 marks	Same family as 241	Very slight cases and put in isolation ward.	128	—	—	—	—
268	E. R.	M.	12	„ 20	„ 14	„ 16	„ 19	„ 4	„	„	21	„ 3 „			128	—	—	—	—
269	E. O.	F.	14	„ 21	„ 15	„ 17	„ 20	„ 20	Discrete	„	36	„ 2 „		Slight pitting	139	—	—	4	2
270	G. R.	M.	51	„ 20	„ 15	„ 17	„ 19	„ 8	„ m.	„	24	„ 2 „	Father to 241		128	—	—	—	—

TABLE OF CASES OF SMALL-POX—*cont.*

No.	Name.	Sex.	Age.	Notification.	Onset.	Rash.	Admission to Hospital.	Termination.	Type of Attack.	Result.	Duration in Days.	Vaccination Data.	Remarks.	Clinical Features of Attack.	Households. All Inmates.				
															Ref. No.	Under 1 Year.	1 to 10.	10 to 39.	30 Years upwards.
Col. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
271	L. L.	M.	5	1893. June 19	1893. June 15	1893. June 17	1893. June 19	1893. Aug. 1	Confluent	Rec.	48	*Unvaccinated*		Abscesses	140	—	3	4	2
272	A. P.	F.	39	„ 20	„ 16	„ 18	„ 19	July 13	Discrete	„	28	Infancy: 3 marks	Infected by 232		122	—	—	—	—
273	M. R.	F.	7	„ 20	„ 17	„ 19	„ 19	„ 18	„	„	32	*Unvaccinated*	Same family as 241, &c.	Abscesses	128	—	—	—	—
274	D. L.	M.	5	„ 20	„ 17	„ 19	„ 20	Aug. 15	Confluent	„	60	„	Newfoundpool case	Abscesses; pneumonia; severe pitting.	141	—	3	1	2
275	H. U.	M.	25	„ 21	„ 18	„ 20	„ 20	July 19	Coherent	„	32	Infancy: 1 mark	„ „	Gastric catarrh	142	—	—	3	—
276	A. M.	F.	36	„ 23	„ 18	„ 20	„ 21	„ 11	Discrete, m.	„	24	„ 3 „	„ „		143	—	3	1	1
277	H. L.	M.	20	„ 28	„ 19	„ 21	„ 25	„ 14	„ m.	„	26	„ 3 „		About 12 papules	144	—	1	5	2
278	G. T.	M.	18	„ 26	„ 19	„ 21	„ 23	„ 8	Mild	„	20	„ 5 „	Newfoundpool case		145	—	—	8	1
279	S. B.	F.	42	„ 24	„ 19	„ 21	„ 23	„ 7	„	„	19	*Unvaccinated*	„ „	Had small-pox 40 years ago (pitted). Present attack about 6 papules.	146	—	—	1	2
280	T. O.	M.	26	„ 26	„ 21	„ 23	„ 25	„ 1	„	„	11	Infancy: 4 marks	„ „	About 6 papules	147	—	—	3	2
281	G. B.	F.	6	„ 27	„ 22	„ 24	„ 25	„ 18	Discrete, m.	„	27	*Unvaccinated*	„ „	About 24 papules	148	—	3	1	1
282	E. L.	F.	8	„ 24	„ 22	„ 24	„ 24	Aug. 1	Confluent	„	41	„	Sister to 274	Very severe; abscesses	141	—	—	—	—
283	E. A. G.	F.	6	„ 27	„ 23	„ 25	„ 27	July 13	Mild	„	21	„	Newfoundpool case	Very mild	149	1	3	—	2
284	G. P.	M.	22	„ 28	„ 23	„ 25	„ 27	„ 19	Discrete, m.	„	27	Infancy: 4 marks	„ „	About 24 papules	150	—	1	1	2
285	J. B.	M.	43	July 1	„ 23	„ 26	„ 30	„ 14	Mild	„	22	„ 3 „	„ „ next door to 251		151	—	2	1	2
286	M. B.	F.	18	„ 1	„ 26	„ 28	July 1	„ 13	„	„	18	„ 3 „	Visited house in N. F. P., 13th June	About 12 papules	152	—	—	4	1
287	S. M.	F.	47	Aug. 1	„ 28	„ 30	„ 31	Aug. 22	Coherent	„	56	„ 2 „		Anomalous case (? not small-pox).	153	—	2	5	2
288	S. A. L.	F.	32	July 3	„ 29	July 1	„ 2	July 12	Confluent	Died	14	*Unvaccinated*	Infected by child 274	Dusky rash	141	—	—	—	—
289	E. L.	F.	3	„ 3	„ 29	„ 1	„ 2	„ 15	Mild	Rec.	17	„	Sister to 271. Desquamating from scarlet fever.	Scanty rash; doubtful	140	—	—	—	—
290	E. C.	F.	7 months	Aug. 8	„ 30	„ 2	„ 8	Aug. 3	Coherent	„	35	„	Newfoundpool case	At home 6 weeks	154	1	2	—	2
291	E. S. L.	M.	40	July 5	July 2	„ 4	„ 4	July 22	Discrete	„	21	Infancy: 3 marks. Revaccinated 1871.	Father of 271 and 289	About 36 papules	140	—	—	—	—
292	G. T.	M.	22	„ 11	„ 2	„ 4	„ 9	„ 22	Mild	„	21	Infancy: 2 marks		About 24 papules	155	—	—	1	2
293	A. W.	M.	10	„ 10	„ 4	„ 6	„ 9	Aug. 15	Coherent	„	43	*Unvaccinated*	Newfoundpool case	Large papule; severe pitting.	156	—	4	5	2
294	E. A.	M.	23	„ 11	„ 5	„ 7	„ 11	„ 16	„	„	43	„		Bronchitis; abscesses; marked pitting.	157	—	3	3	2
295	C. P.	F.	29	„ 11	„ 6	„ 8	„ 10	„ 1	Mild	„	27	Infancy: 3 marks	Was near hospital 24th June		158	—	—	1	1

TABLE OF CASES OF SMALL-POX—*cont.*

No.	Name.	Sex.	Age.	Notification.	Onset.	Rash.	Admission to Hospital.	Termination.	Type of Attack.	Result.	Duration in Days.	Vaccination Data.	Remarks.	Clinical Features of Attack.	Households. All Inmates.				
															Ref. No.	Under 1 Year.	1 to 10.	10 to 30.	30 Years upwards.
Col. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
				1893.	1893.	1893.	1893.	1893.											
296	W. S.	M.	11	July 9	July 6	—	—	—	Mild	Rec.	—	*Unvaccinated*	Doubtful case. Varicella ?		159	—	1	3	1
297	A. K.	F.	45	„ 11	„ 8	July 10	July 11	Aug. 22	Confluent	„	46	Infancy: 2 marks	Nursing patient who died from "typhoid" 24th June.		160	—	1	—	3
298	W. B.	M.	17	„ 13	„ 9	„ 11	„ 12	„ 2	Coherent, m.	„	25	„ 4 „	Newfoundpool case		161	—	—	4	2
299	W. A. C.	M.	3	Aug. 8	„ 14	„ 16	Aug. 8	„ 22	Confluent	„	40	*Unvaccinated*	Brother to 290	At home 4 weeks	154	—	—	—	—
300	E. F.	F.	20	„ 4	„ 22	„ 24	July 26	„ 8	Mild	„	18	Infancy: 4 marks	Newfoundpool case	About 6 papules	162	—	1	6	1
301	E. A. D.	F.	21	July 27	„ 22	„ 24	„ 27	„ 15	Discrete	„	25	„ 4 „	„ „		163	—	—	3	—
302	S. S.	M.	29	Aug. 4	„ 25	„ 27	Aug. 2	„ 16	Mild	„	23	„ 5 „	„ „	About 24 papules	164	1	1	3	—
303	C. G.	F.	25	„ 4	„ 25	„ 27	„ 4	„ 17	Discrete	„	24	„ 2 „	„ „	Lactation	165	—	2	2	2
304	C. P.	F.	20	July 29	„ 25	„ 27	July 29	„ 12	Mild	„	19	„ 4 „	„ „		166	—	—	3	1
305	M. A. E.	F.	31	„ 31	„ 26	„ 28	„ 31	„ 22	Coherent	„	28	„ 3 „			167	—	—	1	3
306	J. S.	M.	49	„ 30	„ 27	„ 29	„ 30	„ 19	„	„	24	„ 3 „	Newfoundpool case		168	—	—	4	2
307	K. S.	F.	30	Aug. 9	„ 28	„ 30	—	—	Mild	„	—				169	—	—	5	3
308	L. C.	F.	22	„ 13	„ 31	Aug. 2	Aug. 9	„ 22	Discrete	„	23	Infancy: 5 marks			170	1	—	2	—
309	E. J. C.	F.	2½	„ 5	Aug. 1	„ 3	„ 4	Oct. 7	Confluent	„	68	*Unvaccinated*		Abscesses; deep pitting	171	1	5	1	1
310	C. M. E.	F.	37	„ 14	„ 9	„ 11	„ 13	Aug. 24	Mild	„	16	Infancy, 4 marks. Revaccinated July 31.	One mark, sister to 305		167	—	—	—	—
311	E. H.	F.	8 months.	„ 16	„ 10	„ 12	„ 15	„ 22	Confluent	Died	13	*Unvaccinated*	? Infected by mother and wife (not reported).		172	1	1	1	—
312	G. O. H.	M.	26	„ 16	„ 10	„ 12	„ 15	„ 31	Mild	Rec.	22	Infancy: 2 marks	Ditto		172	—	—	—	—
313	E. S.	F.	6	„ 16	„ 12	„ 14	„ 15	Oct. 12	Confluent	„	62	*Unvaccinated*	Daughter to 302	Dusky rash; abscesses	164	—	—	—	—
314	A. H.	F.	24	„ 15	—	—	—	—	Mild	„	—	Infancy: ? 3 marks			173	—	—	2	1
315	E. T.	F.	9	„ 16	„ 13	„ 15	„ 17	Sept. 19	Discrete	„	38	*Unvaccinated*	Newfoundpool case	Probably infected by 290	174	—	3	5	1
316	C. T.	F.	4	„ 19	„ 16	„ 18	„ 19	„ 11	Confluent	Died	27	„	„ „	Hæmorrhages	174	—	—	—	—
317	E. H.	F.	8	„ 24	„ 21	„ 23	„ 24	„ 30	Discrete	Rec.	41	„		Slight pitting	175	—	2	1	2
318	M. J. C.	F.	22	Sept. 2	„ 26	„ 28	Sept. 2	„ 19	Mild	„	25	Infancy: 3 marks		Lactation	176	—	1	4	2
319	E. F.	F.	20	„ 7	„ 30	Sept. 1	„ 5	„ 19	„	„	21	„ 4 „	Newfoundpool case	About 12 papules	177	—	1	2	2
320	A. C.	F.	1 month.	„ 6	„ 31	„ 2	„ 3	„ 29	Confluent	„	30	*Unvaccinated*	„ „	Severe, but slight pitting.	178	1	2	1	1
321	O. K.	F.	9	„ 6	Sept. 3	„ 5	„ 6	Oct. 28	„	„	56	„		Conjunctivitis; otitis; abscesses.	179	1	2	3	2
322	F. W.	F.	12	„ 11	„ 6	„ 8	„ 11	„ 12	Discrete, m.	„	37	„		Mastoid abscess	180	—	3	3	2

Table of Cases of Small-pox—*cont.*

No.	Name.	Sex.	Age.	Notification.	Onset.	Rash.	Admission to Hospital.	Termination.	Type of Attack.	Result.	Duration in Days.	Vaccination Data.	Remarks.	Clinical Features of Attack.	Households. All Inmates.				
															Ref. No.	Under 1 Year.	1 to 10.	10 to 30.	30 Years upwards.
Col, 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
323	F. D.	F.	17	1893. Sept. 14	1893. Sept. 11	1893. Sept. 13	1893. Sept. 14	1893. Sept. 30	Mild	Rec.	20	Infancy : 4 marks			181	1	3	5	2
324	S. F.	F.	14	„ 14	„ 11	„ 13	„ 14	Oct. 21	Confluent	„	41	*Unvaccinated*	Infected by 318	Laryngitis	176	—	—	—	—
325	C. F.	F.	7	„ 14	„ 11	„ 13	„ 13	„ 28	„	„	48	„	„ „	Abscesses	176	—	—	—	—
326	E. R.	F.	19	„ 14	„ 11	„ 13	„ 13	Sept. 26	Mild	„	16	Infancy : 3 marks	„ „		176	—	—	—	—
327	E. F.	F.	10	„ 14	„ 12	„ 14	„ 14	„ 26	„	„	15	„ 4 „	„ „	6 papules	176	—	—	—	—
328	G. F.	F.	9	„ 20	„ 18	„ 20	„ 21	Dec. 1	Confluent	„	74	*Unvaccinated*	Infected by 319	Otitis ; abscesses	177	—	—	—	—
329	M. W.	F.	10	„ 29	„ 20	„ 22	„ 23	Nov. 18	„	„	60	„	Sister to 329	Abscesses	180	—	—	—	—
330	A. B.	M.	28	„ 26	„ 20	„ 22	„ 24	Oct. 10	Mild	„	21	Infancy : 2 marks			182	—	1	2	1
331	F. L. C.	F.	18 months.	„ 27	„ 21	„ 23	„ 26	Nov. 2	„	„	43	*Unvaccinated*	Child of 313		183	—	1	2	1
332	M. A. W.	F.	45	„ 29	„ 21	„ 23	„ 24	Oct. 12	„	„	22	Infancy : 2 marks	Mother of 322		180	—	—	—	—
333	A. B.	M.	42	Oct. 13	Oct. 5	Oct. 7	Oct. 9	Nov. 4	„	„	31	„ 4 „		Conjunctivitis	184	—	3	4	2
334	J. A.	M.	17	Nov. 3	„ 6	„ 8	—	—	„	„	—	„ 3 „	Not admitted		185	—	2	5	2
335	A. S.	F.	22	„ 3	„ 9	„ 11	—	—	„	„	—	„ 3 „	„		186	—	1	5	—
336	E. B.	F.	28	„ 7	„ 10	„ 12	—	—	Discrete	„	—	„ 3 „	„		187	1	2	2	1
337	E. M.	F.	25	Oct. 19	„ 14	„ 16	Oct. 18	Nov. 2	Mild	„	20	„ 3 „		About 12 papules	188*	—	—	10*	1*
338	H. S.	M.	18 months.	Nov. 3	„ 20	„ 30	Nov. 3	Dec. 14	Confluent	„	56	*Unvaccinated*		Conjunctivitis; abscesses.	186	—	—	—	—
339	K. B.	F.	29	Oct. 31	„ 27	„ 29	Oct. 30	Nov. 10	„	Died	15	„		Hæmorrhages	189	—	2	2	—
340	E. A.	F.	10	Nov. 3	„ 28	„ 30	Nov. 1	Dec. 9	Discrete	Rec.	43	„		Abscesses	185	—	—	—	—
341	A. B.	M.	2	„ 7	Nov. 2	Nov. 4	„ 6	„ 22	Confluent	„	51	„	? From mother, 336	Conjunctivitis scesses,	187	—	—	—	—
342	E. A.	F.	8	„ 16	„ 13	„ 15	„ 16	„ 19	Coherent	„	37	„		Abscesses	185	—	—	—	—
343	S. T.	M.	18	„ 22	„ 16	„ 18	„ 21	„ 8	Mild	„	23	Infancy : 4 marks			190	—	—	4	2
344	J. B.	M.	35	„ 23	„ 20	„ 22	„ 23	Jan. 23	Confluent	„	65	„ 2 „			187	—	—	—	—
345	A. G.	M.	3 3	„ 23	„ 20	„ 22	„ 23	„ 13	„	„	55	„ 2 „			149	—	—	—	—
346	A. M.	F.	20	„ 27	„ 21	„ 23	„ 24	Dec. 16	Mild	„	26	„ 4 „	Influenza ? 8th Dec.		191	—	1	4	2
347	L. M.	F.	6	„ 27	„ 21	„ 23	„ 24	Jan. 5	Confluent	„	40	*Unvaccinated*	Newfoundpool case	Abscesses	192	—	2	2	1
348	A. R. R.	F.	7	„ 28	„ 22	„ 24	—	—	Malignant	Died	—	„	„ „	Convulsions ; hæmorrhages.	193	1	3	3	2
349	A. S.	M.	19	Dec. 5	„ 27	„ 29	Nov. 30	Dec. 22	Discrete	Rec.	26	Infancy : 3 marks		Carbuncle, 9th Dec.	194	—	—	5	2
350	E. Y.	F.	42	„ 4	„ 30	Dec. 2	Dec. 3	Jan. 13	Coherent	„	44	„ 4 „	Newfoundpool case		195	—	1	1	3

* In this household there were also nine inmates whose age was not ascertained.

TABLE OF CASES OF SMALL-POX—*cont.*

No.	Name.	Sex.	Age.	Notification.	Onset.	Rash.	Admission to Hospital.	Termination.	Type of Attack.	Result.	Duration in Days.	Vaccination Data.	Remarks.	Clinical Features of Attack.	Households. All Inmates.				
															Ref. No.	Under 1 Year.	1 to 10.	10 to 30.	30 Years upwards.
Col. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
351	M. M. R.	F.	19	1893. Dec. 6	1893. Dec. 3	1893. Dec. 5	1893. Dec. 5	1893. Dec. 19	Mild	Rec.	17	Infancy : 4 marks	Infected by 348	Six papules	193	—	—	—	—
352	F. R.	F.	2	„ 6	„ 3	„ 5	„ 5	„ 7	Malignant	Died	5	*Unvaccinated*	„ „	Hæmorrhagic	193	—	—	—	—
353	A. M.	F.	27	„ 10	„ 6	„ 8	„ 8	Feb. 1	Confluent	Rec.	58	„	Infected by 347	Dusky rash ; abscesses	192	—	—	—	—
354	M. Y.	F.	6	„ 14	„ 12	„ 14	„ 14	„ 1	„	„	52	„		Abscesses	195	—	—	—	—
355	W. G. C.	M.	6	„ 17	„ 12	„ 14	„ 16	Jan. 23	„	„	43	„	Infected by 350	„	196	1	3	2	2
356	A. R.	M.	11	„ 27	„ 18	„ 20	„ 26	„ 23	Discrete	„	37	„		„	197	—	4	5	2
357	H. M. F.	F.	20 months.	„ 25	„ 20	„ 22	„ 24	Feb. 1	Coherent	„	44	„		Otitis	198	—	1	—	3
														193 households		33	328	534	330 Age?-9

Note.—This list does not include the case of W.S, m., æt. 18, admitted into the small-pox hospital on April 18th, 1893, from the county (Thurmaston). He was unvaccinated, and had a severe (confluent) attack.

Eleven of these cases were unrecognised at the time of their illness, and were not notified to the authorities, viz., Nos. 38, 134, 147, 148, 149, 152, 153, 156, 175, 192, 241.

From this table it will be seen that of all the cases, 7 are assigned as malignant, 89 as confluent, 56 as coherent, 78 as discrete, and 127 as mild in type.

In his Report, Dr. Priestley points out that several others here termed "confluent" were malignant or quasi-malignant in character, viz., Nos. 3, 9, 15, 21, 26, 28, 30, 54, 61, 105, 110, 114, 135, 174, 194, 195, 198, 234, 254, 288, 309, 313, 316, 321, 325, 339, 353.

§ 9. *Summary of the outbreak.*

It is not my intention to enter into a detailed history of the outbreak, as that has been amply done by Dr. Priestley in the various reports he has presented to the Sanitary Committee, whilst the earlier stages of the epidemic were exhaustively inquired into and reported upon by a Special Committee. It may, be useful if I present a summary of the whole outbreak month by month, completed by the after knowledge of all the available facts.

I propose, therefore, to mention in turn the fresh invasions of each household in each month, with brief reference to the ascertained sources of their infection and of the cases secondarily arising. In tabular form, the numbers of invaded houses per month are as follows :—

Month.	Number of Houses Invaded.	Numbers Attacked.	Cases arising in		
			Fever Hospital.	Work-house.	Lee Street Common Lodging-House.
1892.					
August - -	—	—	—	1	—
September -	3	5	—	1	—
October - -	3	3	7	—	1
November -	9	12	—	1	1
December - -	11	35	1	1	—
1893.					
January - -	35	46 (47*)	2	2	4
February - -	7	15	—	2	1
March - -	9	14	—	2	5
April - -	19	44	—	—	—
May - -	31	53	1	—	—
June - -	25	32	—	—	—
July - -	16	18	—	—	—
August - -	8	15	—	—	—
September -	5	7	—	—	—
October - -	6	11	—	—	—
November -	6	10	—	—	—
December - -	3	3	—	—	—
	196	323	11†	10	12

* One case re-admitted : apparently re-infected.

† This only includes those cases which arose in hospital and were not removed, but merely transferred to small-pox wards.

1892.

August.—On the 24th of this month, a tramp, W. S., who had been lodging in the town since the 21st, applied for admission to the workhouse infirmary. He had a scanty eruption, the nature of which was not recognised, and he was discharged on August 30. The subsequent occurrence of cases of small-pox in persons known to have been in his No. 1. company led to the discovery of this,—the first case known in this outbreak. He returned to Leicester some weeks afterwards, and, through Dr. Priestley's courtesy, I was able to see the man. He presented stains and traces of the eruption over the shoulders and on the forearms; and a smooth small cicatrix on the arm where he said that he had been vaccinated in infancy.

Nos. 2 and 3. *September.*—On the 4th, Mrs. M. (No. 2), and on the 5th, Mrs. B. (No. 3), who had been living in the lodging-house when W. S. stayed there, sickened : and on the 7th and 8th respectively the rash appeared. No. 2 was admitted into the hospital on September 9, and No. 3 on the 10th. The latter who was unvaccinated had a more severe attack than No. 2, who presented two vaccination scars. The husband and infant of No. 3 were taken into quarantine, and on leaving there on September 19th, the infant was taken charge of by some friends. This infant No. 5. (No. 5), was vaccinated when taken to quarantine, but about the 27th, developed a few equivocal spots. It is not unlikely that the child really had a very mild attack of variola, for two persons who nursed her after she had left quarantine, developed the disease, viz. :—P. J. (No. 8) and Nos. 8 and 9. E. R. (No. 9). In the one case the rash appeared on October 15, in the other on the 17th; both were confluent attacks, that of No. 9 (who was unvaccinated) being accompanied by hæmorrhages. An aunt of No. 9, M. S. (No. 18), who did not come into quarantine, sickened on No. 18. November 3, *i.e.*, 13 days after E. R.'s removal to hospital. No. 4 was an inmate of the ward in the No. 4. workhouse infirmary into which W. S. was sent on August 24 to 30th ; he was suffering from syphilitic caries of the skull and was in a debilitated state. The rash of small-pox developed in him on September 9, and he died in the hospital in a confluent attack, on the 16th. It was not possible to obtain clear evidence of his having been vaccinated, but the fact that in early life he had been in the navy was held to be presumptive in favour of this.* Towards the end of the month, E. J. K. (No. 6), in the No. 6. employ of the Corporation was attacked. The origin of his illness is obscure but apparently the view that most commended itself to those in authority was that he may have been infected through contact with dry refuse which he was engaged in carting from the ashpit of an infected house. But whatever the source of his illness, it was the indirect cause of many cases of the disease that occurred in the following month. He was removed to the hospital on October 3rd, the day in which his rash appeared, and had a confluent attack, very severe at the outset, but rapidly drying up on maturation. He had four vaccination marks of infantile vaccination. At the same time that he was admitted, five other persons were taken to quarantine. One of these was his daughter, E. K. (No. 7), who was No. 7. forthwith vaccinated.

Outbreak in the Fever Wards.—The child E. K. had not been in quarantine nine days before she contracted scarlet fever. At this time the three fever wards were full of children in all stages, and the convalescent block (or old erysipelas ward) contained large numbers of convalescent. Indeed the accommodation of the building was strained to its utmost. E. K. was removed from the quarantine ward (9 in plan) to Ward I. This was on October 11th, and it so happened that a few days before this one or two of the fever patients had developed varicella. The only means of isolation left in the building were the small rooms at the entrances to wards I., II., and III., and it was into one of those that the cases of varicella were transferred. On October 15, *i.e.*, 12 days after her father developed the rash of small-pox and was removed to hospital, the child E. K., who, it may be recalled, was "undergoing vaccination," presented an eruption the characters of which were at first uncertain. The eruption was sparse, and the individual papules small, and although there was not an unanimous opinion as to its nature, yet in face of the fact that some of her ward mates had undoubted varicella, and from the lack of any other isolation accommodation, she was sent on October 15 to the small ward where three other varicella cases were, and indeed occupied a bed with one of them. Her case, however, did not run the course of varicella. On October 17 the three other children were removed from the small ward, and on October 19 E.K. was removed to the small-pox ward, there being no longer any doubt that she had contracted this disease from her father, and that its characters in her had been modified by her recent vaccination. She was then desquamating from scarlet fever. E. K., during the earlier period of her attack of small-pox, had thus been in Ward I. (full of scarlet fever cases) from October 14 (?) to October 15; and in Ward I. (annex) with three fever cases who had varicella from October 15 to October 17.

Of the 43 children suffering from scarlet fever in Ward I. when E. K. was an inmate, five developed small-pox. One of these, E. L. (No. 12), was probably infected before No. 12. admission on October 18th, as she sickened with small-pox on the 26th. Another, H. C. (No. 21), may have been No. 21. infected directly by No. 12, for she is said to have shared her bed on October 28th, *i.e.*, the day before the rash appeared in E. L. At any rate, H. C. fell ill on November 10th, *i.e.*, the 14th day of this possible exposure to infection. The infection of the three other children must, I believe, be attributed to contact with E. K., during the time that she was isolated with them for supposed varicella. That period of exposure, October 15 to 17, harmonises with the dates of their developing small-pox, viz. : G. B. (No. 11) on October 27, G. F. (No. 14) on Nos. 11, 1
October 29, and S. W. (No. 16) on October 29. 16.

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* As the case of W. H. (No. 4) excited much attention. especially, in regard to the question of his having been vaccinated and possibly re-vaccinated, it may be of interest to supplement the above brief statement with a record of the facts as elicited by the Special Committee which inquired into the origin of the small-pox outbreak. It appears that he was discharged from the navy on July 14, 1879, after having served for 14 years and 241 days. The order making re-vaccination compulsory in the navy was passed in 1871. His papers were produced before the Committee, but owing to their mutilated condition the record of his state as to vaccination had been effaced. We are then without any evidence of this, and hence this case has been classified as "vaccination doubtful or uncertain." *Vide* Minutes of Special Committee, pp. 382, 383.

—	Admitted for Scarlet Fever.	Ward.	Attacked with Varicella.	Sent Home from Hospital.	Small-pox.	
					Onset.	Rash.
No. 11, G. B.	Oct. 7 -	I.	Oct. 11 -	—	Oct. 27 -	Oct.
„ 12, E. L.	„ 18 -	I.	—	—	„ 26 -	„ 29
„ 14, J. F.	Sept. 15	I.	Oct. 10 -	—	„ 29 -	„ 31
„ 15, F. B.	Oct. 19 -	III.	—	—	„ 29 -	Nov. 1
„ 16, S.W.	Sept. 15	I.	Oct. 6 -	—	„ 30 -	—
„ 20, N.H.	About Sept. 20	?	„ 16* -	Oct. 21 -	Nov. 3 -	Nov. 5
„ 21, H. C.†	Oct. 4 -	I.	—	—	„ 10 -	„ 12
„ 23, R. L.	„ 15 -	III.	—	Nov. 9 -	„ 13 -	„ 16
„ 25, E. P.	„ 28 -	III.	—	—	„ 16 -	„ 20
„ 26, F. H.	„ 12 -	III.	—	Nov. 9 -	„ 18 -	„ 21
„ 28, L. D.	„ 27 -	II.	—	„ 21 -	„ 23 -	„ 25
„ 29, M. R.	„ 28 -	II.	—	„ 15 -	„ 29 -	Dec. 1
„ 30, A. J.	„ 19 -	III.	—	„ 29 -	Dec. 2 -	„ 4

* Placed in the Quarantine Ward which had been disinfected when the K. family left on October 15th.

† Said to have occupied same bed as E. L. (No. 12), on October 28th.

It is, however, impossible to ascribe the infection of all those who were attacked with small-pox whilst in the hospital to this origin. For eight other children, five in Ward III., two in Ward II., and one, placed in the quarantine ward, because of varicella in other parts of the building, contracted the disease. One of them, F. B. (No. 15), may, like No. 12, have been incubating small-pox when attacked with scarlet fever. The rest must have been infected in the hospital; how, it is only a matter of conjecture, but hardly of surprise, seeing that Ward III. is only distant a few yards from the small-pox wing which was then receiving patients. It may be, too, that N. H. (No. 20), who before leaving developed varicella, and was isolated in the quarantine ward just vacated by the family of E. K. (but thoroughly fumigated), was infected there. 3, 26, 30. She and five others were sent home, and had to be re-admitted with small-pox, which had appeared in them 13, 4, 9, 2, 14, and 3 days respectively, after leaving the hospital.

Lastly, in three instances the children infected other members of the family. R. L. (No. 23), who was sent home on November 9, and sickened with small-pox on the 13th, apparently infected his mother (No. 32), who developed small-pox in quarantine on December 1st,* F. H. (No. 26), who was sent home on November 9, and sickened with small-pox on the 18th, infected his brother (No. 31) with whom he slept, and who was attacked on December 4th, 12 days after No. 26 returned to the hospital. M. R. (No. 29), who was sent home, on November 15th, sickened with small-pox on the 29th, so that she probably was infected on leaving the hospital. She was re-admitted on December 1st, and her father, W. R. (No. 36), fell ill on the 12th, and had a very sparse papular eruption on the 14th; he was admitted on December 17th.

Thus, taking the whole series of cases which arose in the hospital wards or were connected with them, we find them ranging from September 15 to December 14, a period of two months.

The hospital was cleared of its scarlet fever inmates by October 31st, with the exception of a few who were too ill to leave.

It may be added that of these 158 scarlatinal cases 74 were found to be vaccinated; and 10 were vaccinated on the appearance of small-pox in the wards and within 24 hours of their return home. All the children attacked with small-pox were unvaccinated, and three of their number (13) died.

October.—On the 24th of this month a man (No. 10) was found in the streets with a maturating eruption. He was employed as a porter and lived at a common lodging-house. He had had some pain in the back on the 18th, but had not felt ill, and he first noticed a rash on the 21st. He was 57 years of age and had been vaccinated in infancy. The establishment accommodates 104 lodgers, and seems to be well managed. I had an opportunity of visiting it, and was informed that there were 85 to 90 "lodgers," several of whom were often absent at work for a week at a time. There is a large day room and kitchen on the ground floor, with lavatory and w.c. at the back; the upper floors being divided into cubicles for the inmates. This man had lived there for two years. When he first fell ill he was moved with his bed and bedding from his cubicle to a separate room. So far as could be ascertained (for in the interval some 12 or 14 had left) only one other inmate contracted No. 19. small-pox. This was W. R. (No. 19), who had occupied a cubicle in the same dormitory as No. 10. He was attacked on November 3, the rash appearing on the 5th. On the discovery of the first case the house was visited daily by the sanitary inspector. Re-vaccination was offered to the inmates, but none accepted it. Another case arising in No. 13. October was that of T. G. (No. 13), who had been employed at the hospital, part of his duty consisting in carrying coals into the wards. He had thus occasion to visit the small-pox wards daily; but had declined to be re-vaccinated. He was taken ill on the 27th; rash on 29th.

November.—On the 3rd of this month M. A. J., æt. 45 No. 17. (No. 17), who was employed in laundry work at the hospital, was attacked with confluent small-pox. She had possibly been infected through washing the clothes of N. H. (No. 20), who was leaving the hospital after her attack of varicella and was incubating small-pox. M. A. J. had declined to be re-vaccinated; and the severe form of her attack, which was characterised by delirium, and terminated fatally, may have been influenced by her acknowledged intemperate habits. On November 14 a labourer (No. 22) was sent on to No. 22. the hospital from the workhouse, having developed a small-pox rash on that day. He had probably contracted the disease outside Leicester. No. 24, a young man living in No. 24. Leicester, but not known to have been in contact with a case, developed a rash on November 16th, and was admitted on the 18th. He was a bicyclist, and possibly was infected in the neighbourhood of the town. The next case (No. 27) was one concerning which some difference of No. 27. opinion existed, the characters of the eruption being so much mortified. Its origin could not be traced.

December.—The following are the fresh infections occurring in this month and the cases connected with them:—W. J. S. (No. 33), a lad of 13, unvaccinated, was admitted No. 33. into hospital on the 21st; but he had been taken ill on the 10th, and had a copious rash, which developed into very large vesicles well out on the 16th. The case was at first unrecognised. He was no longer attending school, but lived in the Beatrice Road, the nearest part of the Newfoundpool district to the hospital, where later in the epidemic numerous cases arose. Two other cases occurred in this family, viz.:—Nos. 44 and 59, who sickened on December 31 and January Nos. 44, 59. 4, whilst a neighbour (No. 69) was attacked on January 7. No. 69. H. J., æt. 8 (No. 34), one of a family of 11 children, all No. 34. unvaccinated, whose ages ranged from one to 17 years, was attacked on the 11th; the rash appeared on the 13th, and the mother thinking it was "only measles," put him in a separate room and nursed him, not seeking medical advice until the 16th. How the child became infected is not known; inquiries were made at the school which he and five others attended, but no clue could then be obtained. This family was not sent into quarantine, but was visited daily for a fortnight by the inspector. Vaccination of the children was offered but refused by the parents. During the fortnight's surveillance, *i.e.*, up to December 31, no case was reported from this house. It was subsequently ascertained that one of the children had a few "spots"; and another was taken ill with vomiting and fever; but was well the next day. It was not until January 10th, 1893, *i.e.*, 24 days after the removal of No. 34, that another child, M. J., æt. 12 (No. 77), sickened. The parents con- No. 77. sidering this to be a case of chicken-pox did not inform the authorities, and kept her at home; but that the case was one of small-pox there can be no question not only from the preceding case, but from the fact that four other of the children were subsequently attacked, viz., N. J., æt. 5 (No. 114), on January 29th; E. J., æt. 4 (No. 122); on Nos. 114, 122, 123, 128. February 4; E. H. J., æt. 14 (No. 123), on February 4; and E. J., æt. 6 (No. 128), on February 12. If No. 77 were not infected from a case intermediate to her attack and that of No. 34, she may have been so through faulty disinfection of the house, or through the father visiting the hospital on January 27th, 28th, and 29th, owing to the critical state of the first child who was then in the ward. W. C., æt. 30 (No. 35), was sent on to the hospital from the No. 35. workhouse on December 15. He had been tramping to Leicester from Warwickshire during the past fortnight and arrived in the town with the rash out. No. 37 was a nurse No. 37. who had been in the service of the hospital since the beginning of October. She was attacked on December 15, and was re-vaccinated on the same day; the small-pox rash appeared on the 17th, and the attack was a very mild one. The next case in the record is that of A. J. P. (No. 38), No. 38.

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* There is some obscurity about this. December 1st was the 14th day of quarantine when No. 32 left; she says she was ailing then, but did not have any rash till December 9th or 10th. She may, therefore, have contracted the disease whilst in quarantine.

which, however, was not known to the sanitary authority
until he was convalescent. It was then ascertained that a
month previously, *i.e.*, on December 15, he had an attack
of "lumbago" with fever, and kept to his house for nine
days, a typical discrete rash having developed. This case
was discovered owing to the admission to hospital in the
beginning of January of three other members of the household,
Nos. 53, 61. two (Nos. 53 and 61) being unvaccinated children,
one of whom died after a most severe attack complicated
with double panophthalmitis. No. 53 was attacked on
January 3; No. 61 on January 5; and a maidservant (No.
No. 67. 67) on January 7, she being re-vaccinated on the 10th, a
No. 94. day after appearance of rash. The housekeeper (No. 94)
who had attended on the children during the week of their
illness that they were at home was not re-vaccinated with
the rest of the family on January 10. She sickened on the
19th and was admitted on the 21st. Another case traceable
No. 63. to the same source is that of V. G. (No. 63), a young
lady friend of No. 38, and visited by him when he was
recovering from his attack. Her illness commenced on
January 5; she was not removed to hospital.

Three members of another family, the source of whose
infection was not ascertained, were attacked about this
time. The first was an unvaccinated child, one year old
No. 39. (No. 39), who was not attended by a medical man. His
illness began on December 15. On January 2nd his brother
No. 43. (No. 43) developed a rash, and the father (No. 48) on the
No. 48. 8th. A woman (No. 57) who nursed the infant when it
No. 57. was ill, sickened with small-pox on January 4. E. M., f.,
No. 40. æt. 15 (No. 40), vaccinated, had a suspicious rash on
December 22nd; and was first isolated from the small-pox
ward. On the 28th her family was removed to quarantine,
Nos. 51, 52. and two of them (Nos. 51, 52) sickened with mild attacks
of small-pox on January 3rd. The father's quarantine
was prolonged for a week, when No. 51 was admitted into
the small-pox ward on the 5th; but he also developed the
No. 92. disease a week later, *i.e.*, on the 19th, or 14 days after his
daughter was removed and 11 days after his wife had been.
His attack was severe. Another family group of cases is
that of the W's., living in Pool Road, Newfoundpool. Mrs.
No. 41. W., æt. 24 (No. 41), had a mild attack commencing on
December 22. She was not taken to the hospital then, but
went there with her infant on January 25, he having been
No. 65. attacked (No. 65) on January 6. The remaining members of
Nos. 96 and 98. the family—E. W., æt. 2½ (No. 96), and Mr. W. (No. 98)—
were removed at the same time, having been attacked on
the 20th. The children were unvaccinated; and the
infant's attack was a mild one, and indeed regarded by the
parents as "severe chicken-pox." The other child (No. 96)
had a severe confluent attack. A young married woman
No. 42. (No. 42) was found to be suffering from small-pox on the
29th and was admitted to hospital. She may have infected
No. 60. another person who visited her (No. 60). The
No. 45. seventh family in which more than one case arose, to be
invaded in December, is that of H.'s, discovered in the
course of a house-to-house inspection of the neighbourhood.
The first to be attacked was N. H., æt. 12, unvaccinated
(No. 45), whose illness was very mild, and was regarded as
chicken-pox. It began on December 31, and her sister,
No. 64. æt. 14, also unvaccinated (No. 64), sickened on January 6.
They were both admitted on the 12th, the rest of the
Nos. 82, 85, 87. family, seven in number, being taken into quarantine. Of
these three sickened, viz., No. 82 on the 16th, No. 85 and
No. 87 on 17th.

No. 46. The case of C. G. (No. 46), who was admitted with a
very mild attack on January 3rd, is of interest in regard to
his infection. He had been, on December 19, to see his
mother at Halifax; she died from small-pox (and apoplexy)
on the 21st; and he first showed symptoms of illness on
the 31st, returning to Leicester on January 2nd, visiting in
the meanwhile his sister's family at Keighley.

No. 47. F. L. (No. 47) had been engaged on railway works at
Chesterfield, and on December 19th had stayed at a house
where a man had small-pox. He was himself attacked on
the 31st; taken to hospital on January 5th; his sister, Mrs.
No. 84. M. (No. 84) falling ill on January 17th.

1893.

January.—Two very mild cases in a brother and sister
Nos. 49 and 81. (Nos. 49 and 81) occurred at the beginning of January,
the former attacked on the 1st, the latter on the 15th. She
had been re-vaccinated on the 9th, the day after the removal
of her brother to hospital, but it did not take. No clue
was obtained to the source of infection in No. 49 nor in
No. 50. that of No. 50, a young woman of 21, the eldest of a
family of ten, of whom the two youngest, æt. five and six,
were not vaccinated. No second case occurred in this
No. 54. house. A school girl, æt. 8 (No. 54), was attacked on the
3rd and admitted on the 8th; she had a severe attack,
characterised in its later stages by continual re-formation
of the crusts, so that it was long before the skin was clear.
At this time another family had several members attacked,
a circumstance which in this, as in other instances, was
associated with the non-recognition of the nature of the
first case. This was a lad of ten years (No. 55), unvaccinated, No. 55,
whose illness commenced on the 3rd, the eruption,
which was discrete, appearing on the 5th. The family
consisted of eight members, three of whom were un-vaccinated;
and four were infected by small-pox, viz., No. 90 No. 90.
(vaccinated), attacked on the 18th, No. 91 (vaccinated) on
the 18th, No. 93 (unvaccinated) on 19th, and No. 101 Nos. 91, 93, 101.
(unvaccinated) on 22nd. It was when investigating these
cases that the Medical Officer of Health found marks of
previous small-pox on the limbs of No. 55, whose rash had
been ascribed to chicken-pox. They were removed to
hospital on the 23rd and 24th, one of the cases (No. 93)
being a confluent attack. Two unvaccinated children of
another family (origin also untraced) were admitted in this
month; the first (No. 56) was attacked on the 4th, the Nos. 56, 89.
second (No. 89) on the 18th. A case (No. 58) in a young No. 58.
man, vaccinated, was received about a week after the
rash appeared (January 6th); there were 8 members of his
family, all unvaccinated, and no second case occurred in the
house. But a fellow worker with No. 58 was attacked on
January 17th (No. 86), and two others (Nos. 100 and 102) Nos. 86, 100,
on the 22nd. The next case is of peculiar interest as 102.
presenting probably a rare instance of re-infection. Mrs.
M. (No. 60) had been attending on Mrs. S. (No. 42) before No. 60.
her removal to hospital on December 29th; and in
consequence her family was kept under observation. No.
42 had sickened on December 24, and on January 5th, *i.e.*
12 days later, Mrs. M. had premonitory symptoms;* a
few shotty-like papules appeared on the skin of the back
on the 6th, but there was no pyrexia, when she was
admitted on the 8th. The case being equivocal, she was
put into one of the detached wards adjoining a general
ward, and attended by a nurse, who subsequently sickened
with small-pox (No. 106). Mrs. M. miscarried on the 12th.
She left the hospital on the 23rd, and was re-admitted on
the 30th (No. 111) suffering from a much more definite
attack, which had commenced with rachialgia, headache, and
vomiting on the 28th. She now had several large discrete
pustules on the face, the maculæ of the previous eruption
being visible on the back. If this were not a case of re-infection,
and the primary illness not small-pox, it is
singular that she should previous to that illness have been
in contact with a case of small-pox, and that the nurse in
attendance should have contracted the disease. The
evidence in support of re-infection seems to outweigh the
argument that these form merely coincidences. The nurse
in question (No. 106) presented a rash on January 23rd, No. 106.
and would therefore have been attending on No. 60 when
infected. Her attack was a very mild one. She had been
re-vaccinated ten years previously, but not on the present
occasion. The large common lodging-house in Lee Street
where two cases occurred in October and November (Nos.
10 and 19) again became infected. The first to sicken was
Mrs. K. (No. 62), the wife of the manager; her illness No. 62.
began on the 4th January, and she was removed on the
8th, the house being kept under observation. On the 12th,
i.e., at too brief an interval to be infected by No. 72, one
of the inmates, a man 50 years of age (No. 78), was attacked; No. 78.
his case was a very mild one, and he went about with the
rash out, but was identified and removed on the 18th. Then
follow a series of other lodgers, each infected in turn, viz.,
J. S., æt. 70, (No. 109), a man who bore the marks of revaccination No. 109.
done 40 years before; when he first ailed
about 28th January, he was sent to the workhouse infirmary,
but spots appeared on February 1, and he went to hospital on
the 3rd. Re-vaccination had been offered to the inmates
of the lodging-house, 102 in number, but declined by all.
Another inmate, F. R., æt. 20 (No. 112), sickened on the No. 112.
28th January; he was vaccinated (one large scar), but
had a severe confluent attack. J. U., æt. 52 (No. 132), who No. 132.
had been re-vaccinated 20 years before, had a very mild
attack, which commenced on February 16; he was removed
on the 25th, the case not being at first recognised. He
apparently infected four other inmates:—No. 141, attacked Nos. 141, 14
March 11, No. 142 March 5, No. 144 March 8, No. 145 144, 145, 14
March 8, No. 146 March 9 (who went to the workhouse on 151.
the 11th and was transferred thence to the hospital), and
the final case of the series was that of B. F., æt. 62 (No. 151),
who was attacked on March 22. No other cases occurred
in this lodging-house after this.

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* I find in my notes that Mrs. M. visited Mrs. S. on the 22nd, and not again until the 27th. If she really were infected by the latter the infection must either have been received before Mrs. S. showed any signs of illness, or the incubation period of Mrs. M.'s case must have been unduly short.

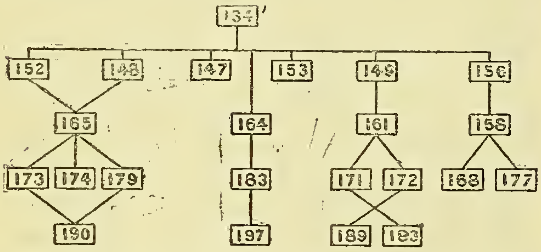
Reference may also be made to the cases sent to the hospital from the workhouse. Besides Nos. 1, 4, 22, and 35 which arose in August, September, and November, there were in January two cases, Nos. 68 and 99; in February two, Nos. 118 and 125, and in March 146 and 154. It will be convenient to deal with these now. They were not connected with one another, and were mostly men who had come to Leicester on tramp. No. 68 was in the Union for about four days with a few papules on him; the onset of his attack being on January 7th, and the rash had been out about nine days before he was sent to the hospital. No. 99 probably contracted the disease at Bromsgrove, whence he had tramped to Leicester; his attack was extremely mild, barely half a dozen papules. He had three scars of re-vaccination in addition to three on each arm of his primary vaccination. No. 118 had come from London to Leicester; he also had been re-vaccinated (two years before) and had a very mild attack. No. 125 had previously been in a lodging-house in B—— Street, where it is supposed he was infected. No. 146, as stated, was infected at L—— Street lodging-house, and went from there to the workhouse infirmary. No. 154 had been tramping from Cambridge to Newmarket at the time of his presumed infection.

M. V., æt. 20, a wardmaid at the hospital who had declined to be re-vaccinated, sickened on January 7 (No. 66). On the 8th her temperature was 104°, on the 9th the rash appeared, and the pyrexia abated. The eruption was composed of papules of various sizes, mostly discrete. She had four large foveate vaccination scars on the left arm.

G. L. (No. 70), æt. 23, may have been infected at a public-house, where he mingled with several people a fortnight before he himself took ill on January 8. He had a proper coherent rash, but the papules instead of really maturating on January 20, became more consolidated and pale. He had four vaccination scars. No. 71 was a child, æt. 5, who had been attending school with a rash out on him, which was found by Dr. Priestley to be small-pox. The papules were small and discrete; the child was unvaccinated. No. 72 was another child, 8 years of age, who attended the same school as No. 55, and as in that case, so here, the diagnosis was not made until another member of the family had sickened (viz., No. 104, a child of five, whose rash appeared on the 28th). It was then found that No. 72 presented evidence of having had small-pox, his rash appearing on the 11th (that of No. 55 had come out on the 3rd). Later, a third member of this household (No. 126), a young woman æt. 21, sickened on February 9, and had a mild attack. S. C., another unvaccinated child (No. 73), was attacked on the 9th, and admitted on the 12th. There were three other unvaccinated children in the family, but they did not contract the disease. In this case the pustules were remarkably large, prominent, and surrounded by wide areolæ. No. 74 was a friend of Mrs. S. (No. 42), and was in her company on the 26th December (No. 42 was then sickening); the rash in her case, a discrete one, appeared on the 12th January, her illness beginning on the 10th. No. 75 is the case of a young man which was not discovered till the mild attack from which he suffered had passed; it had commenced on the 9th, and he had remained at home. Another case treated at home is that of No. 79, a medical practitioner; but it was so slight, and recovery so rapid, that it has only been included in the list with some hesitation. No. 76, who sickened on the 9th, No. 80 on the 13th, and No. 83 on the 16th, were also mild cases, of which the origin could not be traced. No. 80 was living at a lodging-house with 48 other lodgers, none of whom were attacked. Next to be mentioned are three members of a family, of which the first to be attacked was a schoolboy (No. 88) (? attending same school as Nos. 55 and 72), who sickened on the 17th, and was admitted on the 19th. He was unvaccinated, and had a severe confluent attack. Two other unvaccinated children escaped; but No. 119, a lad of 16, vaccinated, had a very mild attack, commencing on February 2; and the father, æt. 35 (No. 124), also vaccinated, sickened on February 4, for a mild attack. On January 20 I accompanied Dr. Priestley to a house in B——Street, where an infant (No. 95) had just died after 24 hours' illness. It presented some subcutaneous petechiæ, and was regarded as a case of malignant small-pox. There seemed to be some connexion between this case and Nos. 42 and 74, with whom the family was acquainted; and the child's father bore equivocal traces of a recent eruption. He had not, however, been ill. A child, 7 years of age, neighbour to the A. family (two of whom had had small-pox, viz., No. 56, removed on the 7th, and No. 89 on the 20th), sickened on the 20th. This child (No. 97) was unvaccinated; her attack was a very mild one. Nos. 103 and 107, who were attacked on the 22nd and 28th respectively, were cases the origin of which could not be traced. No. 105, an unvaccinated girl of 12, who had a severe confluent attack, accompanied by hæmorrhage, attended the same school as No. 88. Her illness began on the 37th, ten days after No. 88 sickened. No. 108. The case of No. 108, a girl of 14, was clinically interesting. She had developed a very scanty eruption on the 27th, and had a very mild attack, *quoad* small-pox; but three weeks later symptoms of meningitis supervened, and for some days her condition was critical. Although it seemed probable that she contracted the disease when going to or engaged at her work (which she had only resumed after eight weeks' absence for "rheumatism" on January 14th), no prior case known to have been in contact with her was discovered. No 110. An unvaccinated child (No. 110), æt. 4, who sickened on the 28th, may have been infected a fortnight previously by a visitor coming from a house where small-pox then was. The child had just then been attacked with scarlet fever. It was admitted to hospital on the 3rd February, and died on the 8th. No. 130. Its mother (No. 130), had a very mild attack, which commenced on February 56, *i.e.*, the 14th day of the child's removal. No. 113. No. 113 was visiting near infected houses on the 15th, and was attacked on the 29th; Nos. 115, 117, 116. Nos. 115 and 117, attacked on January 29 and 31, could not be traced; whilst No. 116, who also fell ill about the same time, may possibly have been infected when engaged in some plumbing work on the hospital premises. He was, however, only engaged on the part most remote from the small-pox wards.

February.—No. 120. The first case in this month's record is another which was untraced, a man, æt. 30 (No. 120), whose illness commenced on the 3rd: he was admitted on the 8th and had a very slight attack. No. 121. B. G., æt. 7 (No 12), had been staying with some relatives a fortnight previous to his attack, which began on the 4th. In the course of his inquiries the medical officer found several children in this house suffering from chicken-pox, and also evidences of a case of small-pox which had passed unrecognised. No. 131. No. 121 apparently infected his sister N. G., æt. 5 (No. 131), before his rash appeared, for she fell ill on the 16th. Both these children had confluent attacks. They were unvaccinated, as also was another child who escaped; but two other members of the family were vaccinated (primarily) on the appearance of small-pox in the house. No. 127. No. 127, who sickened on the 11th, probably contracted the disease outside Leicester, where she had only been visiting for a week previous to her illness. No. 129. A schoolboy (No. 129), æt. 7, was attacked on the 12th. How he contracted the disease is not known; but he apparently infected his father (No. 136. No. 136), who sickened on the 27th. There were four other unvaccinated children in this family. No. 133. No. 133, a child of two years, sickened on the 18th; he had a coherent attack, complicated by bronchitis. There was a history of mild feverish illness in a relative living next door about three weeks previously, but no tangible evidence that the child had been infected there. No. 143. His father, however (No. 143), was attacked on March 7th. A series of cases occurred in three families about this time, which were not known to the authorities until some weeks had elapsed. No. 134. They commence with the case of G. H. (No. 134), æt. 29, who was taken ill with headache and pains in the back on the 21st, followed by a sparse eruption on the arms, wrists, ankles, and forehead. No. 147. His child, æt. 4, unvaccinated (No. 147), was feverish and delirious on March 11th, and also had an eruption like his father; No. 148. the wife (No. 148) complained of pains in the head and back on March 13th; No. 152. and her infant (No. 152), whom she was then suckling, was taken ill a week later. Both children were unvaccinated, and in both the variolous rash was sparse. No. 153. J. W., æt. 30 (No. 153), a lodger with this family, was attacked about the same time as the infant. These five persons comprised the whole household; but from this source five other households were invaded. No. 149. C. P., æt. 16 (No. 149), was in the habit, together with her brother F. P. (No. 156. 156), of taking her dinner with the H. family. She had premonitory symptoms about March 19th, followed by a very scanty eruption. F. P. was taken ill a week later than his sister, and their No. 161 mother (No. 161) was in bed for two days with headache and backache, about a week after F. P. was ill. She had been re-vaccinated in 1872. No. 158. Then Miss H. B. (No. 158) who "walked out" with No. 156, also had an eruption on the face and arms about March 29th. This case was notified and admitted to hospital about the 23rd day, but two other members of the family were attacked, viz., No. 168. No. 168, a girl of 8, who sickened on April 8, and had a coherent attack, No. 177. and No. 177, a girl of 16, who sickened on April 12th, and had a discrete attack. Nor does this conclude the series of cases ascribable to infection from No. 134; Nos. 171, 172. for A. M., æt. 10 (No. 171), and F. M. (172), unvaccinated children, who had fairly mild attacks, were grandchildren of Mrs. P. (No. 161), and sickened on April 10; No. 189. they infected their mother (No. 189), who fell ill on April 23, No. 193. and their unvaccinated sister (No. 193), æt. 3, attacked on the 26th. This last was the most severe

case of the whole series. Another family apparently
infected from the same source is that of T. B., who was a
fellow workman with No. 134, and acquainted with the P.'s
No. 164. (No. 156, &c.). He (No. 164) had a mild attack, which
was not notified and was thought to be influenza. His
illness commenced on April 3rd, and of his three unvaccinated
children, two had small-pox. The one, L. B., æt. 5
No. 183. (No. 183), was attacked on April 17th, probably infected
No. 197. by him, the other B. B., æt. 5, (No. 197), attacked April
29, and probably infected by her sister. Again, the G.
family were apparently infected through the father, being
also a co-worker with No. 134. The first of his family to
No. 165. be ill was Mrs. G. (No. 165), who had taken charge of the
infant H. (No. 152) when its mother was ill. No. 165
sickened on April 4, and two of her unvaccinated children,
Nos. 173, 174. (Nos. 173, 174) on the 10th; whilst the father (No. 179)
No. 179. sickened on the 14th, and a third child (190) on the 24th.
No. 190. Thus more or less directly connected with the unrecognised
case of G. H. (No. 134) were six families, or a total of 37
persons, of whom 23 were attacked with small-pox (nearly
all mild cases); whilst of 12 of them who were unvaccinated
10 were attacked. (*See* diagram.)



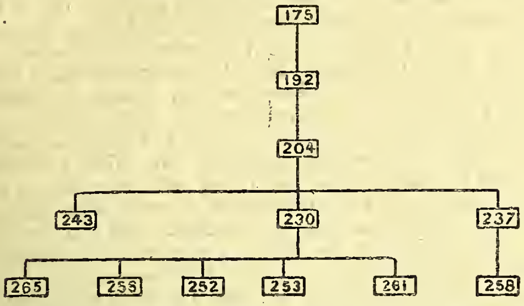
No. 135. Mrs. H. (No. 135), æt. 26, unvaccinated, had a severe
semi-malignant attack. She lived in a house adjacent to
one where several cases (Nos. 34, 77 &c.) had been occurring;
she sickened on February 25th, and was removed on the
No. 155. 27th. Her husband, æt. 28 (No. 155), also unvaccinated,
was sent into quarantine with his three children. He was
probably infected there, as he did not sicken until March
26th, *i.e.*, 12 days after leaving quarantine. His children,
æt. three, six, and nine years, all unvaccinated, did not take
the disease.

March.—Several cases were imported into Leicester
during this month, but in no instance did they give rise to
No. 137. others. No. 137 attacked on March 1st, in a lodging-house,
probably contracted the disease in Northampton.
He was in the Militia, and stated that he had been revaccinated
six years previously, but the evidence of this
was very equivocal. His attack, which was a confluent one,
did not run a typical course, but absorbed at the stage of
No. 138. maturation; the pustules rapidly desiccating. No. 138,
attacked on March 1st, had arrived in Leicester on February
23 from Sheffield. She was an unvaccinated child, æt. 7,
and had a mild attack, and contracted scarlet fever when
Nos. 139, 140. in hospital. Nos. 139 and 140 were fellow labourers, who
had arrived at Leicester from Derby on February 20. They
No. 150. both sickened on March 6th. No. 150, a fortnight before
his attack on March 21st, was in London or Oxford; and
No. 157. had only been at Leicester for four days. No. 157, attacked
on the 27th, lived in the Newfoundpool district,
where so large a proportion of cases subsequently occurred.
No. 159. The origin of the attack of No. 159 is obscure, for she had
remained in her house during the preceding weeks, except
on the one occasion a fortnight before when she went to
the railway station to meet her husband. She was attacked
No. 160. on March 28th. No. 160, who fell ill on the 29th, had
been to the hospital on the 15th to meet her sister (No.
123), then leaving the building.

No. 162. *April.*—No. 162 was a "missed" case. He had felt ill
on the 2nd, and a rash appeared on the 4th; but the case
was not known until the following month when others
were traced. It is possible that his child, who died from
"convulsions" two or three weeks after his illness, may
really have had small-pox. Probably connected with this
No. 191. case is that of No. 191, an unvaccinated lad of 13, who
on April 11th delivered coals at the house, and who
sickened on the 25th. He had rather a severe attack,
being removed to hospital on the 27th. One of his brothers,
No. 209. æt. 10 (No. 209), sickened on May 10, and another, æt. 6
No. 218. (No. 218), on May 13. Both were unvaccinated, the former
having a confluent, the latter a discrete attack. Another
No. 202. case possibly traceable to No. 162 is that of No. 202 (May
No. 163. 3) who lived close by. No. 163, attacked on 3rd April,
attended the same school as some other children previously
mentioned (viz., Nos. 88, 105, &c.); he was unvaccinated,
as also were the five other children of the family, who,
together with the mother, were taken into quarantine for
two days, whilst their dwelling was being cleansed and disinfected.
One of them, R. H., æt. 11 (No. 185), sickened No. 185.
on the 19th and died from hæmorrhagic small-pox on the
25th. A family of whom four members were attacked is
that of the M.'s. The first to fall ill was E. M., æt. 21
(No. 166), an unrecognised case, his illness commencing No. 166.
on April 5th. Both the unvaccinated members of this
family suffered; one, B. M., æt. 9 (No. 182), sickened on No. 182.
April 16, and died from hæmorrhagic small-pox on the
24th. The other, E. M., æt. 6 (No. 187), sickened on the No. 187.
20th; his attack was a coherent one. Miss L., æt. 25
(No. 186), also living in the house, was attacked on the No. 186.
19th. It seems clear that the malignant case had a briefer
incubation period than the others. Three other persons
connected with these cases suffered. One (No. 201) was No. 201.
employed at the same factory as No. 165, who had continued
at her work with the eruption on her until April 20.
No. 201 had a very mild attack commencing on May 2.
No others in this factory seem to have been infected. Nos.
203 and 210 were undertaker's assistants and had been No. 203. No. 210.
engaged in the burial of No. 182 on April 26. Both were
unvaccinated, and the incubation period of No. 203 was
unusually short (nine days) if he then contracted it, for
he sickened on May 5th; but possibly, as Dr Priestley
suggested, his was a case of direct inoculation. No. 210
sickened on May 10th, *i.e.*, 14 days after this presumed
exposure. I now come to a series of cases traceable to infection
from a common source—a navvy (T. S.), who escaped
observation and whose assumption of an alias made the
task of clearing up the etiology of other cases somewhat
difficult for the authorities. No. 167 lodged with this man, No. 167.
and became ill on April 7th, Mr. and Mrs. H. (Nos. 169 Nos. 169, 17
and 170), with whom they lodged, also falling ill on the
10th. A young woman (No. 178), who came in to assist No. 178.
Mrs. H. in her household duties, sickened on the 13th.
This patient had a coherent attack. [Although she presented
a smooth scar on the arm it did not appear to be
distinctly of vaccinal origin; and she stated that her mother
had told her she had never been vaccinated.] G. B., æt. 33
(No. 180), the foreman of the works where "T. S." had No. 180.
been employed, was attacked on April 14, and two of his
three unvaccinated children who were infected by him died
from small-pox. One, G. B., æt. 16 months (No. 194), No. 194.
sickened on the 26th. He had double panophthalmitis and
gangrene of feet, and died on the 17th May. The other
(No. 198), L. B., æt. 3, sickened on the 30th, and died No. 198.
after a prolonged attack with double panophthalmitis and
deep ulceration of the face on June 27th. When "T. S."
left the H.'s lodgings he seems to have gone (under an
alias) to another house, where he lodged with the foreman
of some other works from April 24 to May 15. This man
(No. 217) was attacked with small-pox on May 13; he had No. 217.
a severe confluent attack, complicated by delirium tremens
and pneumonia. He had two vaccination marks. His son,
æt. 15 (No. 219), was with other children vaccinated No. 219.
(primarily) on May 16, and sickened with small-pox on
the 17th. The attack was a mild one, and when I saw him
he was covered with small, miliary, red papules, and the two
vaccination vesicles were well marked. [We were told
that this lad when two years old was "inoculated" by his
mother from the arm of his recently vaccinated sister; but
there was no cicatrix to show that this had been at all
effectual.] A lodger in the same house, æt. 23 (No. 207), No. 207.
was attacked on May 8, and had a coherent eruption, which
dried up rapidly. He had three large foveated vaccination
scars.

Mrs. M., æt. 28 (No. 175), was taken ill on April 10 No. 175.
with what was thought to be influenza. Her parents, Mr.
and Mrs. B., lived hard by, and her married sister, Mrs. W.,
in the town. Mrs. B., æt. 56 (No. 192), had a slight illness, No. 192.
for which she kept her bed for a few days, from April
25; her husband (No. 204) also took ill with "influenza," No. 204.
which he was thought to have contracted from his wife,
his attack beginning on May 6, and he kept his bed for 10
days. The real nature of these cases was revealed by the
illness of Mrs. W. (No. 230), who sickened on May 25, No. 230.
developed a rash on the 27th, notified as small-pox on
June 2nd, and removed to the hospital on June 1st. Her
husband (No. 253) was attacked on June 9th, and their two No. 253.
unvaccinated children: No. 252 on the 8th, No. 261 on No. 252.
the 12th, the latter being a confluent case. A neighbour, No. 261.
Miss B., æt. 17, also sickened (No. 256) on the 10th June. No. 256.
[This case was a remarkable one in a vaccinated subject.
The rash was most copious and confluent, but in four days
it began to dry up, and there was no secondary fever; so
that she was out of bed in a fortnight.] The brother of
Miss B. sickened on June 13th (No. 265), and was probably No. 265.
infected by Mrs. W. In addition to these cases
traceable to infection from Mr. B. (No. 204), there was the
case of Mrs. G., æt. 52 (No. 243), a neighbour to the No 243.
M.'s, who sickened on June 1st; whilst Mr. M. himself

(No. 237) was attacked on May 28th, and sent to hospital on June 1st, and his child (No. 258) on June 13.



Of the rest attacked during April, Nos. 176 (attack on the 11th) and 184 (on the 17th) were navvies at work together on a sewer, and small-pox occurred amongst others of those employed. No. 181 had been at an athletic meeting a fortnight before he sickened, April 16, and may have contracted the disease there. The source of the illness of No. 188 (April 23) could not be discovered. Miss E. B. (No. 195), a schoolmistress, unvaccinated, was attacked on April 27th. She had recently returned from a visit to Coventry, where she was nursing a friend who was said to have "chicken-pox." There can be little question that she here contracted the disease, which she had in a severe confluent form, followed by extensive pitting of the face.* Next come a series of cases which arose at T——, a village near Leicester, whence a case (a man engaged on sewer works) had been taken into the Leicester Hospital, about the 11th April. B. S., æt. two years, unvaccinated (No. 196), living in this village, contracted the disease from her father, and besides her his wife sickened later, as well as another child. B. S. was sent in to Leicester to stay with her grandmother, who kept a sweetstuff shop, where she was found by the medical officer in his inquiries into the origin of another case. No. 196 was attacked on the 28th, but not admitted to hospital until after maturation of the rash, viz., on May 9th. E. S., f., æt. 16 (No. 222), and J. S., m. 3. 14 (No. 223), both unvaccinated, contracted it from their niece, sickening on May 19th (confluent attacks). No. 208, a boy of six, who frequented the shop, was also infected by No. 196; he sickened on May 10; and a like origin may be ascribed to the attack of No. 224 (May 20), who visited the house and saw B. S. with the rash full out. The origin of the illness of E. H., æt. 16, a bricklayer (No. 199), who sickened on April 30, is not ascertained. He lived in Newfoundpool. He was unvaccinated, and had a discrete attack. His father (No. 220) fell ill on May 17th, the last day of the "quarantine" supervision. A fellow worker (No. 251) with these at new buildings in the district was attacked on June 8th. He was 28 years old, unvaccinated, and had a coherent attack. [He stated that his mother was suffering from small-pox at the time of his birth.]

May.—Several "single" cases in households occurred during this month, and most of them not traceable to previous cases. No. 200, however, who was attacked on May 1st, was a wardmaid at the hospital who had declined to be re-vaccinated. Her attack was a very mild one. No. 205 sickened on the 8th; he may have been infected in London, where he had recently been. No. 206, attacked also on the 8th, was engaged at work in Newfoundpool. No. 211, unvaccinated, attacked on the 10th, possibly contracted small-pox in the course of cycling excursions. He had a confluent attack. No. 212, a boy of 7 years, was attacked on May 11, origin not traced. He did not go to hospital till the 17th, and a playmate of his, E. C. (No. 239), sickened on the 29th, and her brother on June 13th. K. G., æt. 9 (No. 213), the child of a lodging-house keeper, sickened on the 11th. There had been other cases amongst children attending the same school. She was unvaccinated, and her attack was a discrete one. Her infant brother (No. 238), who caught it from her, was attacked on the 29th, his case being a coherent one. A child from another house (No. 233) was with No. 213 when she was at home suffering from the rash, viz., May 13 to 16; and he (No. 233) sickened on the 27th. No medical man had been called in to K. G. until maturation of the pustules had occurred; and the same happened in the case of C. G., æt. 5, who sickened on the 11th, and was admitted on the 17th. This child (No. 214) lived at a tavern, but the source of her illness was not ascertained. Similarly there was no evidence of the origin of the case of No. 215, an unvaccinated youth, who had a confluent attack commencing on May 11th, and of No. 216, an unvaccinated child of five years, who was desquamating from scarlet fever when admitted, and who had quite a mild attack of small-pox beginning on the 11th. He was taken into hospital on the 16th, and his father (No. 240) No. 240. was attacked on the 30th. Six mild cases occurred in a family of seven, arising probably from the visit of one of the hospital staff to the house about some dressmaking. These cases (Nos. 221, 244, 245, 246, 247, and 248) will be referred to subsequently. No. 225, whose attack com- No. 225. menced on May 20, the rash appearing on the 22nd, was not admitted to hospital till the 26th. He was an unvaccinated child of 5 years, and his confluent attack was complicated with dysenteric symptoms. He lived at Newfoundpool. Another unvaccinated child, æt. 7 (No. 226), No. 226. who sickened on the 21st, had a discrete attack, not traceable to a preceding one. Mrs. M. (No. 227), living in the No. 227. centre of the town, had a mild attack which began on the 23rd. How she contracted it is not known, possibly in the course of her vocation as a Scripture reader. A next door neighbour, A. A., f., 27, sickened on June 7th (No. 249), No. 249. Mrs. M. not going to hospital till May 29. No. 228, an unvaccinated child of 10, who had a confluent attack, may have been infected at her village T., where other cases had recently occurred; she was, when attacked, staying with her sister in Leicester. Mrs. D. (No. 229) was an "un- No. 229. recognised" case, and never came into the hospital; she was ailing on May 24, and had some spots thought to be chicken-pox; but her husband (No. 255) was attacked No. 255. with small-pox on June 10. No. 231, a Newfoundpool case, No. 231. was also overlooked, and was not admitted until convalescence had set in. L. P., æt. 8, unvaccinated (No. 232), No. 232. lived next door to a house whence six weeks before some cases had been removed. She sickened on May 27, and was removed to hospital on the 31st, when the house was fumigated, the bed removed and disinfected, and returned to the house on June 2nd, when it was occupied by Mrs. P. (No. 272), who was taken ill on the night of June 16, No. 272. *i.e.*, 16 days after the child had left. No. 234, a confluent No. 234. case in an unvaccinated adult, and No. 238, a severe discrete No. 235. case in a vaccinated adult, were fellow labourers at W., a suburb of Leicester, where cases were known to be present. No. 236, an unvaccinated adult, the foreman of some sewage No. 236. works, and alcoholic in habits, sickened of confluent (malignant) small-pox on the 28th May, and died on June 8.

At my visit on June 29, Dr. Priestley took me to see No. 241. G.W.R., æt.23 (No. 241), a young man, vaccinated in infancy, who had recently passed through a brief illness attended by a rash, the maculæ of which on the face and limbs seemed to be unequivocal. He had not felt well on May 29, and spots had appeared on the 31st. Subsequent to this seven out of the remaining eight members of his family—all but two of them had been vaccinated in infancy—had illnesses which could only be small-pox, although in several the eruption was extremely sparse. One, L. R., f., 21 (No. 263), sickened on No. 263. June 13, two—H. R., 8, and E. R., 12 (Nos. 267, 268)—on Nos. 267, 268. the 14th, the relative sparseness of the rash being concordant with their ages. K. R., æt. 14 (No. 257), sickened on No. 257. the 11th, *i.e.*, on the 13th day of her brother's illness. Of the two unvaccinated children, A. R., f., 2 (No. 262), took No. 262. ill on the 13th, and had a coherent attack, followed by No. 273. abscesses, and M. R., f., 7, on the 19th, had a severe discrete attack; whilst G. R., æt. 51 (No. 270), whose illness No. 270. began on the 17th, had a mild discrete attack. No. 242, a No. 242. young woman of 19, sickened on May 31st; but it is not known where she contracted the disease.

June.—During this month out of a total of 25 newly-invaded households, 14 were in the Newfoundpool district, and, with hardly an exception, the very thorough and searching inquiries made by the medical officer and sanitary inspector failed to trace the origin of the first cases arising. This fact is the more striking in view of the remarkable manner that many a history had been unravelled and the disproportionate incidence of the disease on the community of the district led Dr. Priestley to surmise that the infection proceeded from the hospital, possibly by aërial diffusion or through mediate agencies. There are 18 cases in this group of which one, already mentioned, No. 251, may have been infected by a fellow-workman. The remainder fell ill on the following days: June 12th, one case; 15th, one; 17th, one (and two later cases in the house) sickening on the 23rd and 29th respectively; 18th, two; 19th, two; 21st, one; 23rd, four; and 30th, one case. In two instances besides that above noted, a later case arose in the house. One of these was remarkable in the fact that the second case (No. 345), the father No. 345. of the first patient was not attacked until November 20th, whereas his child (No. 243) had only been in hospital from No. 243. June 27 to July 13. Clearly this was a re-infection of the house or No. 345 had contracted the disease from a fresh outside source. In the other instance the first outside No. 299. case (No. 290), an unvaccinated infant, sickened on June 30, but the case was not known to the authorities until August 8, when, together with a second case, an unvaccinated child No. 299. of three (No. 299), who had sickened on July 14, it was removed to the hospital. These cases had infected two Nos. 315, 316. others living in another house, viz., Nos. 315 and 316, who were attacked on August 13th, both unvaccinated children, one a discrete the other a confluent case.* Of the cases arising in the town during the month, five were connected with previously occurring cases and have been already noted. There remain six, all in separate houses, and in none No. 250. of which was the origin clear. These are, No. 254, a young man of 20, unvaccinated, illness began on the 10th; No. No. 260. 60, an unvaccinated child of ten years, attacked on the 12th; No. 266. No. 266, an unvaccinated child of seven years, on the 13th; No. 277. No. 277, M., æt. 20, vaccinated, who had a mild discrete No. 86. attack beginning on the 19th; No. 286, a girl of 18, who may have been infected by visiting a dressmaker's in Newfoundpool, although no case was in the house), and who had a mild attack starting on the 26th, and No. No. 287. 287, a case open to much doubt as to its nature, in a woman of 47, whose rash appeared on the 28th, but took an anomalous and chronic course, and whose case was not notified until August 1st.

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* The case of this young woman has been referred to in evidence given before the Commission. (See evidence appended to the Commission's Fourth Report, Questions 13,133–44 and 14,674–90.)

July.—In this month of 16 newly-invaded houses, 11 were in the Newfoundpool area, and apparently not directly connected with any preceding cases, although, of course, it would be difficult to disprove such connection in a restricted community like this. In only one instance did more than one case occur in the house. No. 302, æt. 29, had a mild attack beginning on the 25th July, and not removed to hospital till August 2nd, six days after the rash appeared; No. 13. and No. 313, one of two unvaccinated children in the family of five persons, was attacked on August 13, with confluent small-pox. Probably connected with these cases No. 319. are those of Nos. 319 (sickened August 30), and 320 No. 320. (August 31) whilst No. 319 infected an unvaccinated child of nine (No. 328), who had a confluent attack commencing on September 18. The nine other cases occurring in this No. 292. month were in eight households; one, No. 292, attacked on the 2nd, was discovered at home a week later and No. 294. removed to the hospital. Another, No. 294, an unvaccinated subject, æt. 23, sickened on the 5th, and was No. 295. admitted on the 11th; he had a coherent attack. No. 295, a young woman æt. 29, sickened on the 6th, and may have been infected by having been in the vicinity of the hospital or by calling at invaded houses. Her attack was a very No. 296. mild one. No. 296 was an even milder case, not admitted No. 297. to hospital. It began on the 6th. No. 297, a woman (vaccinated) of 45, was attacked on the 8th. It was elicited that 14 days previously she had attended a patient who was certified to have died from "typhoid" after an illness of three days, characterised by a profuse eruption and by violent delirium. If this account be correct the case could not have been enteric fever, and hardly anything else but malignant small-pox. No. 297 had a confluent attack, which, however, "dessicated," and though accompanied by secondary fever, was only followed by slight pitting, but by most extensive staining of skin. [She had two very faint scars on the left arm; and Dr. Priestley, from his experience of other similar cases in vaccinated subjects, felt sure that she could not have been unvaccinated.] Another vaccinated subject who had a rather severe attack No. 305. was No. 305 (f., 31), who sickened on July 26. It was not ascertained when she contracted it. The eruption in her case, although very profuse, did not pustulate to any extent, and what pustules did form were remarkably small. Her No. 310. sister (No. 310), who had been re-vaccinated on the 31st, one insertion taking, sickened on August 9th, with a very mild attack. Allowing for the usual period of incubation she must have been infected on the very day the first Nos. 307, 308. symptoms occurred in No. 305. Nos. 307 and 308, attacked on the 28th and 31st respectively, were both mild cases, the former passing unrecognised at the time and not admitted to hospital.

August.—Only eight houses were newly invaded in this month, four being in Newfoundpool; but of these three were traceably infected from previous cases. The remaining four households yielded nine cases. E. H., f., æt. eight No. 311. months, unvaccinated (No. 311), and G. O. H., æt. 20, No. 312. vaccinated (No. 312), were both attacked on the 10th, the infant dying in the hospital on the 22nd. On inquiry Dr. Priestley found Mrs. H., about 14 days before their illness, had also been ailing, and that she had a few "spots" which had left stains, but no medical man was called in. It is possible that she infected her husband and infant, but her case has not been included in my list. No. 314 is No. 314. the case of a young woman which occurred about this time but of which I had no details; she remained at home, and had a very mild attack. No. 317, an unvaccinated child No. 317. of eight years, had a discrete attack, marked by unduly large pustules. She sickened on the 21st, and had been away from Leicester between the 5th and 12th, the period when she was probably infected. No. 318, a married No. 318. woman 22 years of age, was living with her parents and four sisters in an ill-kept house in a court, when she was attacked with small-pox on the 26th. She was removed to the hospital on the 2nd September, the day after the rash commenced to fade. Each of her sisters and a lodger contracted the disease (Nos. 324, 325, 326), sickening on the 11th September, and the other (No. 327) on the 12th. Two were unvaccinated, C. F., æt. 14 (No. 324), and C. F., No. 324. æt. 7 (No. 325); the former had a coherent rash, the No. 325. vesicles being as large as peas, and she also had symptoms of laryngitis; the latter had a most profuse confluent eruption. The remaining two, E. R., æt. 19 (No. 326), No. 326. and E. F., æt. 10 (No. 327), who both bore large foveated No. 327. vaccination scars, had extremely mild, a febrile attacks; that of E. F. of such a doubtful character (only three or four spots in all), that she was kept isolated from the small-pox patients. The origin of these cases could not be traced, but the infant daughter (No. 331) of No. 318, No. 331. who had been sent to another house, sickened on September 21st, and was probably infected through her mother, who was suckling it, when she took ill, by No. 327, who visited the child on September 5, and again on the 12th, the latter date being that on which E. F. herself first ailed. This infant, who was unvaccinated, had a mild attack.

September.—Only four fresh centres occurred in this month, yielding six cases, the sources of infection in each of the four instances being unknown. No. 321, a girl of No. 321. 9, unvaccinated, sickened on the 3rd; she had a confluent attack complicated by purulent conjunctivitis. No. 322, f., No. 322. æt. 12, one of a family of six unvaccinated children, was attacked on the 6th; her illness was a mild one. Her sister, æt. 10 (No. 329), who had shared her bed, was No. 329. attacked on the 20th—a very severe confluent case—and the mother, æt. 45, (No. 332), attacked on the 21st. It is noteworthy that another child as much exposed to contagion from No. 322 as was No. 329, did not contract the disease. No. 332. No. 323, f., æt. 17, had a mild attack commencing on the No. 323. 11th, her brother having been taken ill with typhoid fever about the same time. No. 330, æt. 28, also a mild case, No. 330. sickened on the 20th.

October.—Six households were invaded in this month, yielding 11 cases; in two instances the first arising case being unrecognised, and in one that case not having medical attendance. No. 333 (a man, æt. 42), lived in a No. 333. street previously free from cases, and the source of his infection could not be ascertained. His attack, a mild one, began on the 10th. No. 334, a youth of 17, whose illness No. 334. commenced on the 6th, did not leave off work, and when subsequently seen presented a few characteristic pits and stains on the skin. One of his unvaccinated sisters, æt. 10 (No. 340), sickened on the 28th; her attack being a No. 340. discrete one; and another, æt. 8 (No. 342), apparently infected by No. 340, fell ill on November 13th, and had a coherent attack. No. 335, Mrs. S., æt. 22, had a mild No. 335. attack commencing on the 9th, and was not medically attended; her unvaccinated infant, (No. 338), was attacked No. 338. on the 20th, and admitted into hospital on November. 3rd. His attack was a severe one. The other inmates of the house consisted of the father (who was re-vaccinated) and three male lodgers under 19 years of age, all vaccinated. The case of Mrs. B. (No. 336) passed unrecognised, her No. 336. illness commencing on the 10th, and a rash appearing on the 12th. Her child (unvaccinated), æt. two years (No. 341), No. 341. sickened on November 2nd, and had a confluent attack, for which he was removed to hospital on the 6th, his father (No. 343), æt. 30, falling ill on the 20th November No. 344. This man, who had two vaccination scars on the left arm, had a confluent attack. No. 337 (f., æt. 25), was an No. 337. assistant in a large drapery establishment. It is not known how she contracted the disease, which began on the 14th October; but all the other employées (19 in number) in the establishment were forthwith re-vaccinated. No second case arose among them. No. 339 is a fatal (semi- No. 339. malignant) case in an unvaccinated woman æt. 29. Her illness (the origin of which was not traced) commenced on October 27th, and terminated on November 10th.

November.—Of the six houses freshly invaded in this month, three were in Newfoundpool, and yielded seven cases, as follows:—No. 347, an unvaccinated child of six, No. 347.

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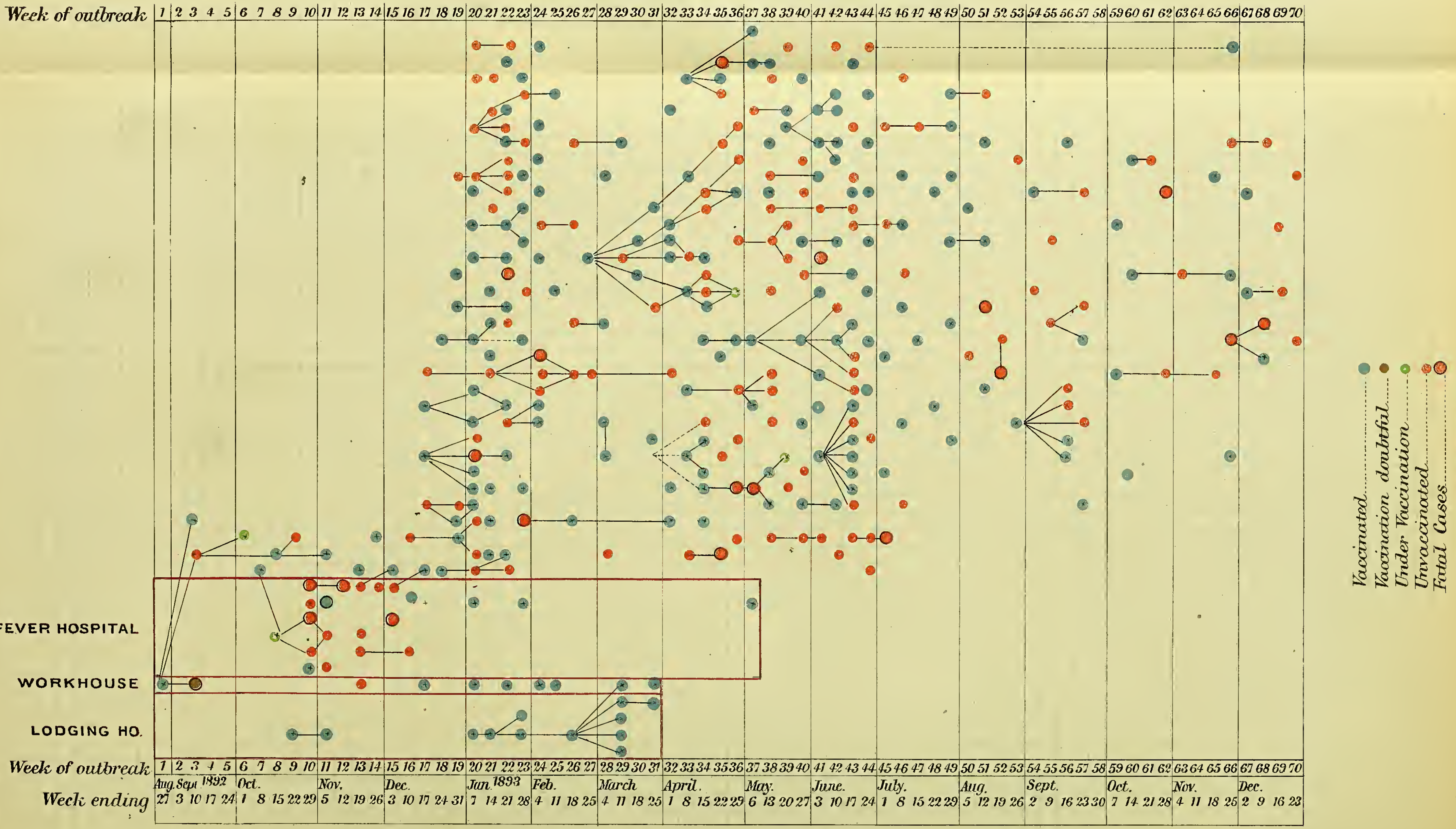
* Since writing the above I have seen a short account of the Newfoundpool outbreak published by Dr. Priestley, which sums up the whole argument in favour of the infection of the district from its vicinity to the hospital; and I propose to append this to the report.

Chart II.

LEICESTER SMALL POX, 1892-3.

Diagram to illustrate course of outbreak shewing the connection between cases of the Disease so far as this was traceable.



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was attacked on the 21st; and was removed to hospital on the 24th. Her mother (No. 355), æt. 27, also unvaccinated, sickened with severe symptoms on December 6th, and was at once removed to an isolation ward at the hospital, when on the 8th she developed a profuse rash, which became afterwards confluent. Her infant, seven months of age, was not infected. No. 348, a girl of seven (unvaccinated), sickened on the 22nd and died on the 26th from malignant small-pox. She could not be removed to the hospital, but her two sisters were attacked on December 3rd, *i.e.*, 12 days after her illness began. Of these two, one (No. 351), æt. 19, vaccinated, had a mild attack, only five or six spots on the arms and face; the other (No. 352), æt. two years, unvaccinated, died in the hospital on December 7th, with hæmorrhagic small-pox. No. 350, f., æt. 42, vaccinated, had a coherent attack commencing on November 30th, and it is singular that precisely 14 days before she had been given a letter sent from Bradford to her mother containing information of her sister's death from small-pox, the letter having been sent by the person from whose house the patient had been removed on October 25. It would be difficult to prove that a letter thus transmitted could be carried about for a fortnight, and only infect a third person to whom it was shown at the end of that period. Seeing the recent prevalence of small-pox in the neighbourhood, it is hardly necessary to seek an explanation for the attack of No. 350 in what was most likely only a curious coincidence. The child of this patient (No. 354) sickened on December 12, and had a confluent attack.

The remaining cases arising in November are No. 343, m. æt. 18, attacked on the 16th; No. 346, f., 20, on the 21st; and No. 349, m., 19, on the 27th. This man was a soldier on furlough from Chatham, where he had probably been infected, for there was a small epidemic in that town at the time not far from the barracks. It was ascertained that his re-vaccination on entering the army "did not take"; and certainly he only bore three primary scars.

December.—Only three houses were freshly invaded in this month—one at Newfoundpool and the others in opposite quarters of the town. They yielded three cases (Nos. 355 to 357), the origin of which was not determined.

For the map appended to this report, indicating the position of the houses infected during the outbreak, I am indebted to the Health Department.

The Fever Hospital Staff.

It will have been observed that six persons employed at the hospital contracted small-pox, viz., No. 13, T. G., æt. 43, employed in attending to the fires, &c. in the building, including the small-pox wards. No. 17, M. A. J., æt. 45, employed as laundress at the hospital. No. 37, E. P., æt. 25, who had been for a short time employed as a nurse in the hospital, having previously been in the laundry (quarantine cases). No. 66, M. V., æt. 20, a wardmaid. No. 106, E. W., æt. 40, a nurse in the small-pox wards 200, A. S., æt. 23, a wardmaid.

Of these, Nos. 13, 17, 66, and 200 had been vaccinated in infancy, but not re-vaccinated; No. 106 said that she had been re-vaccinated 10 years before; and No. 37 was re-vaccinated on the day that she showed premonitory symptoms.

No. 13 had a severe confluent attack his illness lasting seven weeks.

No. 17 was known to be of intemperate habits, and died on the 13th day of her illness.

The attacks in the cases of Nos. 37, 106, and 200 were extremely mild and characterised by very sparse symptoms, whilst No. 66 had a discrete attack

The staff at the fever hospital at the end of 1892 consisted of 28 persons, viz., one medical superintendent, 1 matron, 15 nurses, 1 cook, 3 wardmaids, 4 laundresses, 1 stoker, 1 porter and his wife. Of these 22 had either been re-vaccinated (including 8 re-vaccinated at the time of the outbreak) or had formerly had small-pox, and the only one who did not fall into these categories and who escaped attack was the matron, who visited the wards occasionally but took no part in the actual nursing of the cases. (*See* Dr. Priestley's Report.) "During the epidemic 1892–3, there have been "12 additions to the small-pox staff, consisting of 5 nurses "3 laundresses, 1 wardmaid, 1 stoker, 1 assistant porter, "and 1 quarantine assistant. They were all re-vaccinated." (*Loc. cit.* p. 120.)

ADDENDUM TO HISTORY OF OUTBREAK.

In view of the interest and importance of the question of the aërial dissemination of small-pox from hospitals, I have reproduced here from the columns of the "Lancet," (August 6, 1894), the text of a paper read at the Congress of the British Institute of Public Health by Dr. Priestley, which deals exhaustively with the Newfoundpool cases that were so disproportionately numerous to those in the rest of the borough.

The Aërial Diffusion of Small-pox.

Dr. Priestley said: "The subject for discussion to-day is an important one, and I am tempted to give you my own experience somewhat in detail: firstly, because I was at one time *against* the aërial theory of the spread of small-pox from hospitals; and, secondly, because the Leicester experience is practically unique. Whilst admitting all the arguments that may be brought against the aërial theory, I am bound to confess that some, at least, of the facts that I have met with during the Leicester epidemic are only explainable on such a theory. You may, however, judge for yourselves from the following facts. About the middle of June, 1893, the cases of small-pox notified as occurring in Newfoundpool district became numerous, and it has been impossible to explain many of them except by assuming that they became infected from the hospital. The exact manner in which this is brought about is, I confess, a somewhat difficult question to decide, though it would seem to be either (*a*) *directly* through contact between patients and people outside the hospital, and by infection carried out by visitors, members of the staff, &c.; or (*b*) *indirectly* through the air, which may be (1) the atmosphere or (2) sewer gas—*i.e.*, through the drains. Probably both means of infection play important parts. What is found in Leicester is that the comparatively greatest number of cases is to be met with at Newfoundpool, a community consisting of about 3,000 people living in 600 houses. The position of the houses in regard to the hospital is south or south-west, whilst the distance of the nearest houses from the hospital is 620 feet and that of the furthest 1,750 feet. In this way a circle of 2,000 feet radius, with the hospital as a centre, would take in all the houses. Newfoundpool being, as it were, an isolated suburb, we can easily treat of it separately, though by reference to a map of Leicester it will be seen that with a circle of double the above radius many cases of small-pox that have occurred in the north end would also be included.

"Taking the cases from the commencement of our epidemic and analysing them, we find that—

In December, 1892,	there	sickened	3	cases	Beatrice Road -	- 2
					Pool Road -	- 1
In January, 1893,	„	„	5	„	Beatrice Road	- 2
					Pool Road -	- 3
In February, 1893,	„	„	0	„		
In March, 1893,	„	„	1	„	Ruby Street -	- 1
In April, 1893,	„	„	1	„	Ruby Street -	- 1
In May, 1893,	„	„	3	„	Ruby Street -	- 1
					Hawthorne Street	- 1
					Beatrice Road	- 1
In June, 1893,	„	„	16	„	Rowan Street -	- 2
					Beatrice Road	- 9
					Ruby Street -	- 2
					Ivanhoe Street	- 3
In July, 1893,	„	„	10	„	Beatrice Road	- 3
					Ruby Street -	- 2
					Ivanhoe Street	- 1
					Sylvan Street -	- 2
					Newport Street	- 1
					Fosse Road -	- 1
In August, 1893.	„	„	6	„	Oban Street -	- 1
					Ruby Street -	- 2
					Newport Street	- 2
					Beatrice Road -	- 1
In September, 1893,	„	„	1	„	Newport Street	- 1
In October, 1893,	„	„	0	„		
In November, 1893,	„	„	4	„	Beatrice Road	- 3
					Ruby Street -	- 1
In December, 1893,	„	„	5	„	Beatrice Road	- 2
					Ruby Street -	- 3

"There have thus been 55 cases of small-pox in Newfoundpool, representing 38 infected houses, of which 16 were in Beatrice Road (23 cases), eight were in Ruby Street (13 cases), four were in Ivanhoe Street (four cases), two were in Newport Street (4 cases), two were in Rowan Street (two cases), two were in Sylvan Street (two cases), one was in Hawthorne Street (one case), one was in Oban Street (one case), one was in Pool Road (four cases), and one was in Fosse Road (one case).

"Further, of the 16 infected houses in Beatrice Road 11 were on the side nearest to the hospital (the back doors of the houses facing it), whilst Ruby Street, Ivanhoe Street, Newport Street, Rowan Street, Sylvan Street, Hawthorne Street, Oban Street, and Fosse Road all run at right angles to Beatrice Road—Rowan, Hawthorne, Ruby, and Ivanhoe Streets being nearest to the hospital at the respective distances, measuring to the middle of the streets, of 1,060, 1,077, 1,100, and 1,150 ft.

"Out of a total of 347 cases of small-pox 55 have occurred at Newfoundpool, giving a case-incidence there of 18·3 per 1,000 of the population as compared with 1·6 per 1,000 for the rest of the borough—that is to say, the Newfoundpool

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Explanation of Chart II:—

This Chart has been prepared to illustrate, so far as the dates permitted, the connexion between persons attacked by small-pox during the progress of the epidemic. The colours indicate the condition of the patients as to vaccination.

people have suffered 11 times as much as the rest of the town. It is only fair, however, to examine these 55 cases more minutely to find out, *e.g.*, how many have arisen from previous cases and how many there are for which we fail to discover any definite source save that of probable infection from the hospital. As the result of my examination I find that out of the 55 cases 20 may be attributed to previous ones—*i.e.*, may be regarded as quarantine cases. Deducting these 20 cases, we still have 35 cases (representing 34 infected houses) whose sources of contagion are difficult to explain, save on this theory of hospital infection. Treating now the rest of the cases in the town in the same way—*i.e.*, deducting all those that have arisen from previous cases (as traced out by me) and comparing them with the Newfoundpool ones—we find that the ratio is as 1 to 20.

"So, too, by working out the number of *houses* infected in Newfoundpool and the rest of the borough, we find the ratio as 1 to 15.

"Thus, however we examine the subject—whether from the point of view of all cases, corrected cases, or infected houses—we find that Newfoundpool district has suffered 11 to 20 times as severely as the rest of the town, and in my opinion this state of things has been brought about by the close proximity of the Small-pox Hospital. The death-rate of the Newfoundpool cases is 7·2 per cent., as compared with 5·8 per cent for the rest of the borough.

"Taking the June cases (16 in number), we find that they sickened between the dates June 8th and 30th, and, dating back from 12 to 14 days for the incubation period of small-pox, we may assume a period of acute infectivity in Newfoundpool district between May 25th and June 18th. If, now, we analyse the weekly hospital returns we find that during the same period (May 25th to June 18th) the average weekly number of small-pox cases in the wards was 46. Treating the July cases (ten in number) in the same way, we find a period of acute infectivity in Newfoundpool extending from June 20th to July 15th, during which period the weekly average of hospital small-pox cases was 34. Combining these two periods of acute infectivity, it would appear that the hospital practically caused its greatest infection in the month of June, during which the weekly average of small-pox cases in the hospital was 49—a larger average than in any month during the year, except February, when the weekly average was 54. Why small-pox did not spread into Newfoundpool during February is a question which naturally suggests itself, and to endeavour to answer which I will now proceed. As mentioned previously, there are various ways in which a small-pox hospital may act as a centre of infection. 1. It is acknowledged that infection may spread directly from person to person; so that it is readily understood how contact between patients, officials, visitors, &c. in the hospital and persons outside may spread the disease. Personally I have been unable, however, to trace such contact, and the stringent rules that have been enforced during our epidemic have, moreover, practically rendered such a means impossible. Even assuming such contact to have taken place, it is strange that it should have happened in June and not in February. 2. Air-borne infection does seem to play a part in small-pox epidemics if we may judge from various reports, not only those specially published by the Local Government Board but also those that have lately appeared in connexion with recent small-pox outbreaks in various large towns. The air-borne infection may be (*a*) above ground—*i.e.*, through the atmosphere—or (*b*) underground—*i.e.*, through the drains; and in either case it is reasonable to suppose that, taking a hospital as a centre, the cases would crop up more thickly the nearer the houses were to that hospital. Such is the case with the infected houses in Newfoundpool. In considering this air-borne infection there are many matters deserving our attention. Foremost are the accompanying meteorological conditions—*e.g.*, rainfall, temperature, direction of winds, &c.—and in considering these conditions I have been struck with the great difference as between February and June (see Table). In February the rainfall was 2·12 inches; the mean temperature low, varying from 45° to 31° F.; whilst the direction of the winds was principally west and south—*i.e.*, away from Newfoundpool and the state of the weather was blue sky on nine occasions and cloudy on 14, whereas in June the rainfall was 0·64 inches, the mean temperature high, varying from 70° to 45°, whilst the direction of the winds was principally north and east—*i.e.*, right over Newfoundpool from the hospital and the state of the weather was blue sky on 19 occasions and cloudy on nine. Meteorological conditions, therefore, would certainly favour the spread of germs from the hospital towards Newfoundpool during June, but not in February. The barometric pressure was low in February, high in June. 3. Another means by which germs might be carried is by flies, rats, &c., and, though at first blush this may seem a far-fetched theory, when examined more carefully it is not so. Some recent experiments made by Sawtschenko show that cholera bacilli can live in the alimentary tract of a fly and be found alone in the excreta. He fed flies on the intestinal contents of cholera cases and found the characteristic bacilli in their alimentary canals and their excretions afterwards. Considering the number of flies and rats we have had at the hospital (the flies we might speak of as a plague, in such quantities were they), it is easily understood how they might carry infection about, more especially during the warmth of June than during the cold of February.

"Everything, therefore, seems to favour the theory that our small-pox hospital has, during part at least of our epidemic, been a centre of infection; but the exact mode in which that infection has spread it is somewhat difficult definitely to decide, though personally I am satisfied that the air has played an important part. Germs might also pass through the drains and be drawn by the ascensional force of evaporation through sewer gas into the houses. It is, I believe, thought by some that Newfoundpool district is unsanitary, allowing of the escape of sewer gas into and around the houses there. I accordingly had all the houses infected by small-pox examined by the smoke test, with the result that of 38, only eight showed any sanitary defects, and those but slight ones. Further, it is a remarkable fact that during our epidemic of typhoid fever (1893)* no case directly arose in Newfoundpool, and yet typhoid fever is acknowleged to be an index of the sanitary, or rather insanitary, state of a house or district.† I also had the whole of the houses on the north side of Beatrice Road—*i.e.*, all those houses whose backs face the small-pox hospital and are separated therefrom by 622 ft.—examined by the smoke test, with the result that out of a total of 54 houses, 41 gave no results and 13 showed slight defects—viz., escapes of sewer gas into external closets, through rain-water pipes connected direct with drains, or from round about defective gullies (sinks). Of these 13 houses four only had been infected by small-pox, whereas of the 41 that gave no results five were actually houses which had been infected by small-pox. Thus:—

54 houses	invaded by small-pox	9	4 showing sanitary defects. 5 showing no sanitary defects.*
	not invaded by small-pox	45	9 showing sanitary defects. 36 showing no sanitary defects.‡

Rain-water pipes were only found directly connected with the sewer at Nos. ——, ——, and ——, Beatrice Road (the first only being a house infected by small-pox). There are no storm-water sewers in Newfoundpool, I am told. The only conclusion (if any) to be drawn from the above facts is that an insanitary state of the house drainage does not *per se* give rise to small-pox, even when near to a small-pox hospital. The Sanitary Committee, fully alive to the danger of a small-pox hospital being near to other buildings, have endeavoured during the year to find a suitable site away from the town, but as yet unsuccessfully."

§ 10.—RECORD of the PROCEEDINGS of the TOWN COUNCIL, SANITARY COMMITTEE, and FEVER HOSPITAL SUB-COMMITTEE, relating to the SMALL-POX EPIDEMIC.

By the courtesy of the Town Council I am enabled to append here the text of the recommendations made by the Sanitary and Hospital Committees and of the resolutions bearing thereon which were passed at the meetings of the Council. They give in succinct form the history of the steps that were taken to deal with the epidemic.

It may be convenient if I here briefly summarise the chief points which arise out of these extracts, and thus to present in a connected form an outline of the history of the sanitary administration of the borough during this outbreak, so far as the information here furnished permits. It will be seen that quite early in the outbreak the Sanitary Committee received detailed reports of its progress from the Medical Officer of Health, giving particulars of the several cases and of the measures taken. Apparently the accommodation for quarantining families at the hospital soon proved to be insufficient, for we find that the Fever Hospital Committee on October 31st, 1892, passed a resolution to the effect that the "present arrangements for watching "persons at their own homes will be sufficient." But the "quarantine" block at the hospital was then occupied by children convalescing from scarlet fever, and on November 1st, it was resolved to invite parents, if they so desired, to remove their children therefrom. At the same time steps were taken to provide an iron building, the erection of which was sanctioned by the Sanitary Committee, who at the same time (November 2nd, 1892) arranged for the daily visiting by the inspectors "of the 40 convalescent cases who had left the hospital to-day," and the Medical Officer was authorised to vaccinate any of these children if so desired by their parents.

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* One house in Oban Street became infected by typhoid fever from an outside source.

† It is only right to state that, previously to the decline in the number of Newfoundpool cases, several sewer ventilators in the streets there were by order closed and shafts run up some of the houses. This may have had a beneficial effect.

‡ That is, so far as the smoke test showed.

On November 9th, 1892, the Town Council received a report from the Sanitary Committee recommending the erection of a new hospital for infectious diseases on the site of the existing one, at an estimate expenditure of 55,000*l.*, the sanction of the Local Government Board being sought to raise a loan for that amount. The Town Council considered this report on November 15th, the amount of the loan being fixed at 20,000*l.* as a first instalment; but the proposal was rejected, there being an equality of votes for and against it, and the Mayor declaring it to be lost.

On December 14th, 1892, the Fever Hospital Committee resolved to institute an inquiry into the outbreak of small-pox at the hospital, and a special sub-committee for this purpose was appointed, with Ald. Clifton in the chair. This sub-committee met several times, and exhaustively investigated the earlier history of the outbreak, and in particular into the cases arising amongst the poor patients at the hospital. The inquiry extended from December 21st to March 2nd, 1893, when the sub-committee issued a report together with verbatim minutes of the evidence. That report was received by the Sanitary Committee on March 24th.

On December 16th, 1892, the Sanitary Committee decided to have plans prepared for three small buildings in lieu of the existing small-pox wards; and on December 21st, the Fever Hospital Committee recommended that the scarlet fever wards be utilised for small-pox.

On January 13th, 1893, the Sanitary Committee considered a report from the Medical Officer pointing out the importance of isolation of those who had been exposed to infection from small-pox cases, and suggesting an increase in the hospital accommodation, an improvement in the quarantine building, and urging the thorough disinfection of houses invaded by the disease. The committee decided to carry out the suggestion of improving the quarantine accommodation, and appointed a sub-committee to consider the question of erecting new temporary quarantine buildings. This matter was dealt with at the meeting of the Town Council on the same day, when it was agreed to provide additional accommodation for quarantine on the eastern side of the existing hospital at an estimated cost of 1,800*l.* Steps were taken on the 14th and 20th by the Fever Hospital Committee to carry out this resolution, pending the completion of which the chairman was authorised to arrange for the use of one of the houses belonging to the Corporation at Newaster, for temporary quarantine purposes, if found desirable. On February 28th, the Town Council received a report from the Sanitary Committee upon the tenders for the auxiliary building to be erected on the eastern side of the existing Infectious Diseases Hospital, and resolved to apply to the Local Government Board for sanction of a loan in connexion with these new buildings. A motion to defray the cost out of revenue, should the Local Government refuse its sanction, was put and lost.

Meanwhile the system of removing persons exposed to infection to 14 days' quarantine at the hospital was only being partially carried out. In many instances the alternative plan of daily supervision of such persons at their own homes was instituted; so that the need for extending quarantine accommodation was being less urgently pressed. It was indeed finally settled, on the adoption, on April 7th, by the Sanitary Committee of the joint report of the Fever Hospital and Zymotic Diseases Sub-committees, which was appointed on December 15th, 1892, to inquire into the outbreak of small-pox. The recommendations bearing on this matter given in this report was that "on a case of small-pox occurring, the patient should be at once removed to the hospital, and the other occupants of the house taken to a building apart from the small-pox hospital, and given a disinfecting bath and their clothes disinfected. In the meantime, the dwelling-house, and all therein should be throughly disinfected, and afterwards they should be allowed to return to their houses, but visited daily for 14 days by a Sanitary Inspector, who should report to the Medical Officer immediately any sickness occurred. . . ." "We are also of opinion that all persons who are frequently brought into contact with small-pox patients should adopt all protective measures known to science." It was further resolved, on April 14th, to print and circulate the report which had been drawn up by a minority of that special sub-committee, which did not, however, make any recommendations, but urged that the limitation of the outbreak had "confirmed the value of what is known as the Leicester method of dealing with variolous outbreaks."

From a report made by the Medical Officer to the Fever Hospital, on May 10th, the steps then taken and referred to as consisting in (1) removal of patient to hospital and disinfection of rooms; (2) placing of inmates of infected house "under quarantine observation at their own homes" for 16 days; (3) notification of any illness among the "quarantined;" (4) the quarantined ought not to go to work during whole or part of their quarantine—compensation being allowed in each case, no more than to cover rent and maintenance, or if quarantined at hospital, only such as covered rent, and replacement of fresh clothes, bedding, or to replace those destroyed; (5) "Persons whilst under quarantine observation are allowed to go about and are encouraged to take walks into the country, but are advised not to enter anybody's house, any public institutition, or meeting, under penalty of forfeiting their monetary allowance." The Medical Officer also stated that he was led to prefer to watch the people at their own homes to sending them into quarantine even from the opinions held by some that quarantine wards within the same curtilage as small-pox wards may be a source of danger to their inmates. (For his other statements see letter.) On May 12th the Sanitary Committee resolved that "the course of procedure in reference to quarantine in connexion with small-pox now being pursued as reported by the Medical Officer to the sub-committee be continued for the present."

I may here remark that this procedure virtually abandoned the method of removal of infected persons to quarantine, and substituted for it a system of supervision termed "quarantine at their own homes" in all cases, in which however a considerable amount of liberty was given to the people in their movements, and in certain cases permission granted them to continue at their employment. It is clear that this plan, which, it may be added, seems to have succeeded as well as the other, cannot be considered as equivalent to strict quarantine.

On May 30th and June 5th the Town Council had before them the report of the sub-committee on the outbreak, and the resolution of the Sanitary Committee thereon. An amendment to adopt the minority report was lost, and another amendment to the effect "that the Council recognises the difficulties experienced by the Sanitary Committee in dealing with the recent small-pox outbreak in the borough and approves the arrangements now in force for checking the further spread of the disease" was carried and adopted as a substantive motion.

On June 14th the Fever Hospital Committee had under consideration the reply of the Local Government Board declining to sanction a loan for the proposed new small-pox buildings in the vicinity of the present hospital, and resolved to again approach the Board on the subject.

On June 23rd the Sanitary Committee depute their chairman to make a statement to the Council "showing the difficulties in which the Committee are placed in dealing with the outbreak of small-pox."

On June 30th the Sanitary Committee decided to advertise for land for a site for a proposed now Infectious Diseases Hospital, and on July 31st the Fever Hospital Committee received offers of sites and inspected some of them. At the same meeting it is decided to re-open the fever wards;* but on September 26th the Sanitary Committee reported to the Council that "in consequence of the continuance of small-pox your Committee regret that they have been prevented for several months past from authorising the reception of fever cases at the hospital." and mentioned their endeavours to procure another site for a temporary small-pox hospital. Such a site seems ultimately to have been selected by conference with the Sewage Farm Committee, but it was not utilised. At any rate a building was erected on the site of the present hospital, which reeived small-pox cases in January 1894.

I.

Proceedings and Resolutions of the Town Council.

November 9th, 1892.

Report presented to the Council by the Sanitary Committee on Wednesday, the 9th day of November 1892.

Proposed new hospital.

Your Committee have to report that they have further considered as to the steps to be taken for the erection of a new hospital for the treatment of contagious and infectious diseases, and they recommend that the plans prepared by Mr. Edward Burgess, for which the first premium was awarded, be adopted, subject to any modifications which it may hereafter be found desirable or necessary to make. The new hospital, which it is proposed to erect on the site of the existing hospital at Freake's Ground, will comprise the following buildings, namely :—

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* These wards were prepared for the reception of cases, but had not been re-opened at the close of the year.

Five blocks of scarlet fever wards, each block to accommodate 26 patients.
One block of typhoid wards, to accommodate 26 patients.
One block of small-pox wards, to accommodate 26 patients.
One block of quarantine wards.
Administration block.
Lodge, laundry, stables, mortuary, and other out offices.

Mr. Burgess states that "the architectural " character of the buildings has been kept as simple " as possible, and all superfluous ornament has " been avoided. The work is, however, estimated " as being very substantial and thoroughly well " built." The buildings generally will be faced with red pressed bricks, with as little stone as possible, and the roofs covered with Welsh slates.

The total estimated cost of the buildings is 45,834*l.*, but this is exclusive of furnishing, fitting, and other probable outlay. Your Committee are of opinion that the total capital expenditure in carrying out the scheme will amount to not less than 55,000*l.*, and they recommend that an application be made to the Local Government Board for their sanction to borrow that sum.

Your Committee, however, do not propose that all the buildings should be erected at once, but advise the Council to proceed with the scheme in sections, as it may be thought desirable, during a series of years. By adopting this course it will be unnecessary to remove more than a small portion of the existing hospital buildings at one time in order to make room for the new blocks, and thus a considerable amount of accommodation for the treatment of patients will be available during the progress of the new buildings. Your Committee recommend that the services of Mr. Edward Burgess be retained as architect to carry out the first block of buildings, leaving the question of the architectural superintendence of other blocks for the consideration of the Committee, and determination of the Council from time to time as it is decided to proceed with the work.

Your Committee recommend that authority be given to affix the common seal to a memorial to the Local Government Board to sanction the borrowing of the sum of 55,000*l.*

Thomas Windley,
Chairman.

Resolved:

That the Report of the Sanitary Committee be considered at a special meeting of the Council on Tuesday next at 5 o'clock.

Resolved:

That the Sanitary Committee be authorised to incur such expense as they may think necessary in any temporary accommodation at the Fever Hospital for the purpose of isolation and treatment of cases of small-pox.

15*th November* 1892.

The Town Clerk presents the report of the Sanitary Committee which was submitted to and received by the Council at the last meeting.

Moved, &c.:

That the report be approved and adopted.

By consent of the Council the original motion is amended as follows :—

"That the scheme for a new hospital as submitted by the Sanitary Committee be approved and placed before the Local Government Board with an application for a loan of 20,000*l.* as a first instalment."

For the motion of Alderman Windley as amended - - 24 votes
Against - - - - 24 „

The Mayor declares the motion not carried.

13*th January* 1893.

The following report was presented from the Sanitary Committee:—

Infectious Diseases Hospital.

"Your Committee have further to report that the number of cases of small-pox in the borough has increased considerably. All the known cases, numbering on Friday last 60, are in the Borough Infectious Diseases Hospital, and a large number of persons who have been in contact with these cases are isolated in the quarantine wards of the hospital, or at their own homes under observation of officers of the department. Your Committee are sensible of the great responsibility resting upon them, and they have every hope that, by energy and vigilance on the part of their officers, and with the co-operation of the Council and the public, the disease may be prevented from spreading to any considerable extent. If, however, the disease should assume more serious epidemic form, it will be necessary to be prepared with more hospital accommodation for the treatment of patients as well as for the isolation of persons who have been in contact with infection; in fact, the resources at the hospital for this latter purpose are now utilised to the utmost. Your Committee have therefore had under their consideration the question of providing more adequate accommodation, and they recommend that a building should be at once erected on the piece of ground on the eastern side of the existing hospital buildings, which may be available at an early date for temporary quarantine purposes. The building proposed is based on a plan published by the Local Government Board, and the estimated cost is about 1,800*l.* Your Committee request authority for this building to be erected with the utmost despatch. Your Committee have called to their assistance Mr. W. M. Cowdell, architect, to prepare the necessary plans and superintend the erection of the building.

Thomas Windley,
Chairman."

Resolved:

That so much of the report as relates to the provision of additional accommodation at the Infectious Diseases Hospital at an estimated cost of 1,800*l.* be approved and adopted.

28*th February* 1893.

Report by the Sanitary Committee.

"Infectious Diseases Hospital.

"The Sanitary Committee beg to report that they have obtained tenders for the erection of the auxiliary building which the Council, at their meeting on the 31st January, authorised to be erected on the piece of ground at the eastern side of the existing Infectious Diseases Hospital, and they have accepted the tender of Mr. J. E. Johnson, of Leicester, at 1,762*l.*, and request authority for the common seal to be affixed to the contract of Mr. Johnson and his sureties."

Moved, &c.:

That so much of the report as relates to the acceptance of the tender of Mr. J. E. Johnson for the erection of buildings in connection with the Infectious Diseases Hospital at the sum of 1,762*l.* be approved and that the common seal of the borough be affixed to the contract with Mr. Johnson and his sureties.

Amendment:

That an application be made to the Local Government Board for a loan of 2,500*l.* for the erection of the proposed new buildings at the Freakes Ground; and that a memorial to the Local Government Board be sealed with the common seal of the borough.

For amendment - - 24 votes
Against - - - 17 „

The Mayor declares the amendment carried, and it is then put as a substantive motion and carried.

Moved, &c.:

That the building at the Freakes Ground be proceeded with, and that, failing a loan being obtained, the cost be defrayed out of revenue.

For motion - - - 13 votes.
Against - - - 26 „

The Mayor declares the motion lost.

30th May 1893.

The Town Clerk submits the reports of the Medical Officer of Health on the small-pox outbreak, the minutes of proceedings of the Fever Hospital Sub-committee of the Sanitary Committee on their investigation of the outbreak of small-pox and report adopted by the Committee on the result of the investigation, copies of which have been furnished to each member of the Council.

Resolved:

That the reports be received and taken as read.

Moved, &c.:

That the report of the Sanitary Committee be approved.

Amendment:

That in the opinion of this Council the proposed report, which was voted for by a minority of the Sanitary Committee, and by direction of that Committee, printed and a copy sent to each member of the Council, contains deductions and conclusions reasonably to be drawn from the reported proceedings of the small-pox investigation, and that it be approved by this Council.

At about 9.30 it is—

Resolved:

That the discussion be now adjourned.

Resolved:

That the adjourned meeting be held on Monday next at 5 o'clock.

5th June 1893.

The Council further consider the motion for the approval of the Sanitary Committee's Report which was at the last meeting of the Council moved by Ald. Clifton and seconded by Ald. Eise, and the amendment thereto, which was moved by Mr. Biggs and seconded by Mr. Orton.

For Mr. Biggs' amendment -	19 votes.
Against - - -	25 ,,

Two members do not vote—15 members are absent when the vote is taken, and there are three vacancies.

By request the votes are recorded by the Town Clerk.

The Mayor declares the amendment lost.

Amendment:

That the Council recognises the difficulties experienced by the Sanitary Committee in dealing with the recent outbreak of small-pox in the borough, and approves the arrangements now in force for checking the further spread of the disease.

For amendment - -	36 votes.
Against - - -	1 vote.

The Mayor declares the amendment carried, and it is then put as a substantive motion and carried.

26th September 1893.

Resolved:

That the Council at its rising do adjourn until Wednesday, the 4th October, at 5 o'clock, for the further consideration of the report of the Sanitary Committee so far as it has not already been disposed of by the Council.

From the report of the Sanitary Committee:—

" Site for Small-pox Wards.

" Your Committee have also to report that for some time they have been endeavouring to procure a piece of land to be used as a site for temporary buildings for the reception of cases of small-pox, with a view to the buildings at Freake's Ground being again rendered available for the treatment of scarlet fever cases. In consequence of the continuance of small-pox, your Committee regret that they have been prevented for several months past from authorising the reception of fever cases at the hospital. Your Committee are glad to be able to report that they have now, subject to the approval of the Council, arranged to purchase a piece of land, containing about 4¼ acres, situate in the Aylestone Lane in the parish of Wigston, and which the Committee are of opinion is very suitable for the purpose above mentioned. The vendor of the land is Mr. John Tebbs, of Glenfield, and the price agreed to be paid is 150*l.* an acre. Your Committee recommend the arrangement for the approval of the Council, and request authority to complete the same without delay."

4th October 1893.

Resolved:

That the Sanitary Committee be requested to confer with the Sewage Farm Committee and to report to this Council as to the practicability of providing suitable temporary small-pox hospital accommodation on some portion of the Beaumont Leys Estate.

2nd January 1894.

Resolved:

That so much of the report as relates to orders to carry out works and abate nuisances; to the public analyst; the inspector of food; persons treated at the fever hospital; erection of temporary buildings and certificates of contagious and infectious diseases be approved and adopted.

Resolutions of Sanitary Committee.

30th September 1892.

Resolved:

That the Medical Officer forward a copy of his report on the outbreak of small-pox now read to the Local Government Board.

21st October 1892.

The Medical Officer of Health submits a report on the discovery of further cases of small-pox.

Resolved:

That all special reports of the Medical Officer of Health to this Committee on small-pox be printed and sent to members of the Committee for their private use and simultaneously to the Local Government Board.

2nd November 1892.

Resolved:

That the borough surveyor be directed to proceed at once with the foundations for the Humphrey's Building; also that a covered way be provided from the new building to the ward, and that the requisite fencing be fixed.

Resolved:

That the chief inspector and one assistant be deputed to visit daily the 40 convalescent cases which the Medical Officer reports to have left the hospital to day and report to the Medical Officer of Health each day.

Resolved:

That the Medical Officer be provided temporarily during the small-pox outbreak with a horse and carriage.

Resolved:

That the Medical Officer of Health be authorised to vaccinate any of the convalescent patients discharged from the hospital to-day if desired by their parents to do so.

4th November 1892.

Resolved:

That the Medical Officer of Health be authorised to furnish the information respecting the cases of small-pox in accordance with the request contained in the letter from the Secretary of the Royal Commission on Vaccination which is now submitted.

11th November 1892.

The town clerk reports the receipt of a communication from the Secretary of the Vaccination Commission stating that the Commission have appointed Dr. Sidney Coupland to attend at Leicester to make an investigation in reference to the outbreak of small-pox and requesting that the Corporation and their officers will give all facilities for the inquiry.

Dr. Coupland attends before the Committee and states the nature of his commission.

It is understood that the chairman will to-morrow meet Dr. Coupland in order to render him assistance in connection with the inquiry.

25th November 1892.

Resolved:

That under the exceptional circumstances of the case 30*s.* be allowed to Mr. Hackett who with his family has been in quarantine at the Fever Hospital and has sustained some loss thereby.

Resolved:

That 10*s.* a week be paid to Mrs. Brett for extra duties at the hospital during the small-pox epidemic.

16*th December* 1892.

Resolved:

That under the exceptional circumstances of the case 30*s.* each be allowed to Mr. Jones and Mr. Rowen, who with their families have been in quarantine, and have sustained loss thereby.

Resolved:

That under the exceptional circumstances of the case 30*s.* each be allowed to Mr. Dewick, who with his family has been in quarantine, and has sustained loss thereby.

Resolved:

That Mrs. Folwell's application to be allowed to visit her child at the Fever Hospital, who is reported to be dying of small-pox, be granted.

Resolved:

That the borough surveyor be instructed to prepare a plan for three small buildings in substitution for the present small-pox wards and that a sub-committee consisting of the chairman, vice-chairman Mr. Biggs, and Mr. Meadows be appointed to consult with the borough surveyor on the subject.

23*rd December* 1892.

Resolved:

That in consequence of the exceptional circumstances of the case 30*s.* be allowed to Mr. Lee, who with his family have been in quarantine, and has sustained some loss.

Resolved:

That 50*s.* be paid towards the cost of the funeral of the child Folwell, who has died at the Fever Hospital from small-pox.

Resolved:

That clothing be provided for the man George Moore, who has been in the hospital.

6*th January* 1893.

Resolved:

That the borough surveyor be instructed to obtain an estimate for a Manchester stove to be placed in the small-pox ward at the Fever Hospital.

Moved, &c.:

That under the special circumstances of the case, 12*s.* be paid towards the rent of Mr. Smith, who has been with his family in quarantine at the hospital.

Amendment:

That it be left in the hands of the accounts sub-committee to determine under the special circumstances of the cases of persons in quarantine, or under isolation, if any, and what allowances shall be made to such persons.

The Amendment is carried.

13*th January* 1893.

The Medical Officer of Health reads his report submitted to the Fever Hospital Sub-committee on Wednesday last as follows:—

Town Hall, Leicester,
13th January 1893.

GENTLEMEN,

WITHOUT wishing to alarm you as a sanitary committee, I feel it my duty to bring one or two matters which are of vital importance before your notice, and to ask your immediate consideration thereon.

You have now in Leicester, many different centres in which small-pox has broken out, and from which the disease may spread, so that it behoves you without further delay to make such preparations as may be necessary. I venture to remind you that Leicester is practically an unvaccinated town, and accordingly your sheet anchor in preventing the spread of small-pox is isolation, isolation not only of the cases, but of the persons who have directly or indirectly come in contact with them. Such isolation to be effective must be prompt, and with the many centres of infection already in the town I need not say that your isolation accommodation will be sooner or later (I may say is now in some respects) taxed to its utmost. Unless you are prepared to immediately isolate all your first cases as they crop up, you will soon lose your control over the outbreak or epidemic (call it what you will), which is at present threatening your hospital accommodation, your quarantine accommodation must be elastic and capable of stretching considerably if it is to be of any use. Further, no cases of small-pox ought to be left in the town if possible.

As your officer of health I beg to offer the following suggestions:—

(1.) That a temporary provision be immediately made for an extension of your hospital accommodation by means of tents or otherwise. The necessity for so doing must be apparent when you consider that your present hospital has only room for 140 cases, and when you remember how important it is to avoid anything of the nature of overcrowding in the wards of a small-pox hospital. Again there are already to-day in the wards of your fever hospital, 25 small-pox patients of whom 22 have been admitted during the last 12 days from 18 different centres. Admitting patients at this rate and remembering that the average stay in hospitals for small-pox is four to eight weeks, it is easy to calculate how long it will be before your present hospital will be full.

(2.) That some of the present quarantine wards be subdivided off by means of wooden partitions into a series of compartments, which would serve as separate bedrooms whilst the first large room could be kept as a dining and recreation room, and might with advantage be supplied with a variety of things that would tend to make quarantine life bearable if not enjoyable. I refer to bagatelle, &c. I recommend also that an extra w.c. or two be provided, and that a caretaker be appointed to look after the quarantine and the quarantine only. Further, as more quarantine accommodation will be (I may say is) needed, it may be well for you to consider the advisability of at once taking some house or houses in the town, away from the fever hospital houses wherein to place and watch people who have come into contact with small-pox cases.

(3.) That disinfection be carried out more stringently. By this I mean that all houses in which small-pox breaks out should be first thoroughly fumigated as customary with sulphur; but, further, that the wall papers shall be stripped off, ceilings and walls to be white or lime washed; all paints and floors be washed thoroughly with soap and water or with some disinfectant solution in addition to the stoving of all clothes and bedding in the hospital disinfecting machine.

In conclusion, I would remark that I have purposely avoided all reference to the all important subject of vaccination and re-vaccination—not because I do not value them as a means of stamping out small-pox, but simply because I feel the importance under the present circumstances of strengthening as much as possible your Leicester system and because I am most anxious to avoid anything of the nature of a discussion, which, unfortunately, in Leicester might at present prove useless. I shall, however, have something to say on the subject of vaccination and re-vaccination afterwards.

Yours faithfully,
J. PRIESTLEY.

Moved by Mr. Richardson, seconded by Mr. Ellis and carried:

That the report be received.

Moved by Mr. Richardson, seconded by Mr. Leavesley, and carried:

That so much of the report as recommends the partitioning of the quarantine ward be adopted and the work carried out.

Moved by Ald. Clifton, seconded by Mr. Ellis, and carried:

That the question of erecting new temporary quarantine buildings on the land adjoining the Fever Hospital site or other land be considered by a sub-committee composed of the following gentlemen, namely:—Mr. Biggs, Mr. Booth, Mr. Brady, Ald. Clifton, Mr. Ellis, Ald. Wilford, and Ald. Windley, and reported upon at the next meeting of the Sanitary Committee.

Moved by Ald. Clifton, seconded by Mr. Ellis, and carried:

That the Medical Officer's recommendation as to disinfecting the infected houses in the town be carried out.

Moved by Mr. Biggs, seconded by Mr. Richardson, and carried:

That the Chairman, Vice-Chairman, and Medical Officer of Health be authorised to order and have erected in such position as they may think suitable any tents which they may find to be requisite.

Moved by Mr. Richardson, seconded by Mr. Brady, and carried:

That the recommendation of the Medical Officer, that a caretaker be engaged for the quarantine wards, be adopted.

The Medical Officer of Health expresses his objection to any quarantine buildings of a permanent character being erected in proximity to the hospital.

20*th January* 1893.

Resolved:

That 10*s.* be paid to Mrs. Folwell for the clothing of her child, which died in the hospital, the clothing having been destroyed.

The report of the Fever Hospital Sub-committee as entered in the sub-committee minute book on pages 392 and 393 is read.

Moved, &c.:

That the report be approved.

Amendment:

That the report be approved, except that the Medical Officer of Health be authorised to furnish information to the newspapers as to small-pox daily.

The amendment is not carried and the motion is put and carried.

Resolved:

That Mr. Cowdell be engaged as architect for the proposed block of hospital buildings, and that he be instructed by the borough surveyor.

Resolved:

That the chairman be authorised to arrange for the use of one of the Corporation houses in the Newarke for temporary quarantine purposes if found desirable.

27*th January* 1893.

Resolved:

That the resolution passed by the Committee at the last meeting approving the report of the Fever Hospital Sub-Committee be rescinded so far as relates to furnishing the information to the Press in reference to small-pox, and that the Medical Officer of Health be authorised to give daily information to the Press.

Resolved:

That the information to be given to the Press be the number of the cases which occur each day and the locality of the cases.

Resolved:

That notices be given under sections five and six of the Infectious Diseases Prevention Act, 1890, where necessary with the object of securing effectual disinfection of infected houses and articles.

10*th February* 1893.

Resolved:

That Mr. Jayes of 78, Norfolk Street, be prosecuted for neglecting to notify a case of small-pox.

3*rd March* 1893.

Resolved:

That a further 30*s.* be paid to Mr. Raven in consideration of his additional loss in consequence of his having to remain.

The Town Clerk reports the prosecution on Monday last of Henry Jayes of Norfolk Street for neglecting to notify to the Corporation a case of small-pox at his house, when he was fined 1*l.*, including costs.

10*th March* 1893.

Resolved:

That the Fever Hospital Sub-Committee meet on Wednesday next at 4 p.m. to consider the communication of the Local Government Board and as to the hospital expenses and that the meeting to consider as to the reports on the small-pox inquiry be deferred until the following week.

7*th April* 1893.

The report of the Fever Hospital and Zymotic Diseases Sub-Committee received by this Committee on the twenty-fourth March is again considered by the Committee, and it was—

Resolved:

That the report of the Sub-Committee be adopted by this Committee.

Further resolved:

That the report now adopted be presented by this Committee to the Council, and that a print be sent to each member of the Council, accompanied by prints of Dr. Priestley's Reports, and of the minutes of evidence and proceedings of the inquiry into the small-pox epidemic.

The Report of the Sub-Committee details the particulars of the first cases which occurred in the borough, and the history of the importation of small-pox into the fever wards so far as regards the case of E. K. (No. 7 in list), and makes the following recommendations:—

Your Committee are of opinion that the old quarantine wards, which are part of the main building of the scarlet fever blocks, should never be used for such purpose, being also in near proximity to the old small-pox ward; that if there is any quarantine carried out at the hospital. it should be in a building as far as possible from the other infections wards, with separate administration and laundry departments, and then only used in cases where householders can be placed whilst their homes are being thoroughly disinfected; and that all persons who have been known to have come in contact with small-pox cases should be visited as at present by the Sanitary Authority daily for 14 days. If any cases are at all doubtful, they should be then taken up to a part of the old erysipelas ward, which then might be used as a temporary observation ward.

We would also urge that if the old buildings are again used as a scarlet fever hospital, that there should be built in its near neighbourhood a block of buildings quite separate from the others, which could be used for watching doubtful cases of infectious diseases, and that the old small-pox ward, which is now worn out, should be destroyed.

The so-called quarantine system, as practised in Leicester during the present epidemic, has been as follows:—

First.—All persons who had been in contact with a person suffering from the disease were removed into the building, and presumably kept isolated there for 14 days. This is what is generally understood as the Leicester system. In practice it has been found that the persons so quarantined refused to keep within the building, but insisted on visiting homes in the neighbourhood, and associating with friends outside the hospital.

Secondly.—In other cases the person suffering from the disease was alone removed to the hospital, and the other residents of the house were requested to abstain from going about their ordinary business for 14 days, during which time they were daily visited by the sanitary inspectors. During this period compensation was awarded for loss of time, the weak point of this system being that although these people did not go to work, they moved about the town, and visited neighbbouring houses.

Thirdly.—On an outbreak of small-pox occurring in a common lodging-house, in which the sufferer had necessarily come into contact with a very large number of persons, no isolation was attempted, nor compensation given, but the persons were allowed to go about their daily vocation as usual, the system adopted to prevent the spread of small-pox being, that all of the sanitary inspectors visited the lodging-house daily, to see if anyone had fallen ill. If there was any case of sickness, the Sanitary Inspectors reported to the Medical Officer, who visited the case. In each of the above cases the houses were disinfected.

The system which we recommend has been alluded to in the former portion of our Report, viz.: that on a case of small-pox occurring, the patient should be at once removed to the hospital, and the other occupants of the house taken to a building apart from the Small-pox Hospital, and given a disinfecting bath, and their clothes disinfected. In the meantime, the dwelling-house and all therein should be thoroughly disinfected, and afterwards they should be allowed to return to their houses, but visited daily for 14 to 16 days by a Sanitary Inspector, who should report to the Medical Officer immediately any sickness occurred.

We recommend that stringent regulations be made as to all visitors to the Small-pox Hospital, and that no one should be allowed to examine a patient in the absence of the Medical Officer; further, that the Medical Officer take such precautions with regard to the nurses in charge of small-pox patients as he may think necessary, both before they leave the hospital for their necessary out-door exercise, or at other times.

We are also of opinion that all persons who are frequently brought into contact with small-pox patients should adopt all protective measures known to science.

14*th April* 1893.

It was resolved:

That the report on the small-pox inquiry, proposed at the last meeting and voted for by a minority of this Committee, be printed for the private use of the members of the Council, and a print sent to each member.

The report here alluded to also reviews the earlier history of the outbreak in the town, and in the hospital, and dwells upon the fact of the error in diagnosis whereby three children were known to have been infected, and to which, further, they attribute the spread of infection in the hospital. The following excerpts from this report sufficiently explain the views of those who adopted it upon the question of hospital accommodation:—

"Notwithstanding the allegation so frequently made, as to the unsuitability of the hospital for the treatment of more than one infectious disease, we would point out that when other outbreaks of small-pox have occurred during the past 20 years, the three wards of the main building were occupied by scarlet fever patients. The same conditions, therefore, existed as when this outbreak occurred, with this important exception, that previously the small-pox block which is new entirely detached, was then directly connected with the main corridor of the fever hospital, thus enhancing the risk of infection. It is true the fever wards were full of scarlet fever patients at the time this outbreak of small-pox took place, but it must be remembered that the whole of the small-pox block was available for small-pox cases, and was capable of accommodating 30 to 40 patients.

"From October 3rd to October 19th, there were only three patients in the small-pox wards. In the quarantine wards there were only five persons, all of one family, viz.:—Mrs. Kerrad and four children, two of the latter being removed into the fever hospital on the 11th and 12th of October, thus leaving only three in quarantine. It cannot therefore be maintained that either the small-pox or the quarantine parts of the hospital were overcrowded.

"The number of patients in the fever wards would not be of material importance, because, even if they had been occupied with only half the number, they would have been equally unavailable for small-pox patients. It has been alleged that the overcrowded state of the fever wards was the cause of the outbreak in them of small-pox. This cannot be maintained from the evidence, neither can it be affirmed that the risk of infection from small-pox would be very considerable, as there were only three patients in the hospital at the time.

"It is noticeable that whilst Ward No. 3 is most exposed to small-pox contagion, from being nearest to the small-pox block, the disease first broke out in No. 1 ward, which is at the greatest distance, and therefore least exposed to any contagion which might exist.

"Complaint has been made as to the absence of rooms for purposes of isolation at the hospital. Whilst we do not consider the hospital all that can be desired, we would point out that when Evelyn Kerrad first sickened there were at least two rooms—one in the quarantine block and one in the erysipelas block—both of which were entirely unoccupied. There was also another room available on emergency for the purpose of observation or isolation. One of these rooms was ready for immediate use, and the other two could have been prepared in a short time."

This report concluded as follows:—

"The experience of the present attack of small-pox has confirmed the value of what is known as the 'Leicester method' of dealing with variolous outbreaks. Had it not been for the efforts made in this direction we should no doubt have suffered more severely. In the Sanitary Committee, suggestions have been made from time to time, where improvements may be effected in the 'system,' and these will be acted upon in future. Upon these and other matters of a similar kind we make no recommendations, having limited this report to the object and scope of the inquiry."

21*st April* 1893.

The Medical Officer of Health reports that a deputation having waited upon him from the Thurmaston Local Board to request him to admit into the hospital a case of small-pox from their district, under the special circumstances of the case he consented to admit the patient.

Resolved:

That the action of the Medical Officer be approved, but that in future no cases of small-pox be admitted from the outside districts without the special consent of the Committee or the Chairman.

12*th May*, 1893.

Resolved:

That the course of procedure in reference to quarantine in connexion with small-pox now being pursued as reported by the Medical Officer to the sub-committee be continued for the present.

19*th May* 1893.

Resolved:

That payments amounting to 4*l.* 9*s.* be made to persons who are in quarantine at their houses.

23*rd June* 1893.

The Medical Officer reports in reference to the latest cases of small-pox which have arisen.

Resolved:

That the Chairman be requested to make a statement in the Council at the next meeting showing the difficulties in which the committee are placed in dealing with the outbreaks of small-pox.

30*th June* 1893.

Resolved:

That offers of land be invited by advertisement to lease with option of purchase for the erection of a hospital for the treatment of infectious diseases; also that the Estate Committee be asked if they can make an offer of any land for the purpose.

1*st September* 1893.

Resolved:

That 8*s.* be allowed to Mr. Hardy and 15*s.* to Mr. Tyler.

20*th October* 1893.

Resolved:

That the Committee approve of the site offered by the Sewage Farm Committee, and recommend it to the Council for approval if the approval of the owner can be obtained.

19*th January* 1894.

Resolved:

That 1*l.* be allowed to Mrs. Richardson, of 48, Wand Street, whose daughters have been kept from work in consequence of a case of small-pox occurring at her house.

Other allowances have been made on the recommendation of the accounts sub-committee.

RESOLUTIONS passed by the FEVER HOSPITAL SUB-COMMITTEE, and approved by the SANITARY COMMITTEE.

31*st October* 1892.

Resolved:

That in the opinion of this sub-committee the present arrangements for watching persons at their own houses when the hospital is full will be sufficient to meet the case.

1*st November* 1892.

Resolved:

That the parents of the children in quarantine be advised to attend at the hospital so that they may be informed of the danger of small-pox in the hospital, and asked if they wish their children to be brought home to-morrow (Wednesday) or would prefer to leave them at the hospital for the present.

Resolved:

That one of Humphrey's iron buildings (721) at an estimated cost of 170*l.* be purchased and ordered by telegraph to-day.

14*th December* 1892.

Resolved:

That the recent outbreak of small-pox in Leicester so far as it has proceeded be thoroughly investigated and reported upon by this sub-committee.

21*st December* 1892.

Resolved:

That the three scarlet fever wards be recommended to be utilised for the reception of small-pox patients.

Resolved:

That the sub-committee appointed at the last meeting of the Sanitary Committee be requested to consider and report to the Sanitary Committee what alterations and additions are required to enable the preceding resolution to be carried into effect.

14th January 1893.

The sub-committee visit a number of sites proposed for temporary quarantine buildings.

18th January 1893.

Resolved:

That the ordinary weekly return be regarded by this sub-committee as sufficient information to supply to newspapers respecting the present outbreak of small-pox.

22nd March 1893.

Resolved:

That the application of Mr. Pickering made through the Medical Officer of Health for the use of a ward at the hospital for making experiments in his mode of treatment of small-pox be not granted.

10th May 1893.

(*Report of Medical Officer.*)

The method that is now being carried out in Leicester in connexion with the treatment and prevention of small-pox outbreaks is as follows:—

1. The patient is removed at once to the borough fever hospital and the house (room or rooms), bedding, &c., disinfected.
2. The inmates of the infected house and others who may have come into contact with the small-pox case are placed under quarantine observation at their own homes being visited by the inspector daily for 16 days.
3. Any case of illness amongst these quarantined persons is at once notified to the medical officer, who visits the case and removes it to the hospital if necessary.
4. The inmates of infected houses and others who may have been in contact with the small-pox case if thought necessary, are strongly urged not to go to work for the whole or part of their quarantine period of 14–16 days, and during that time have been made such allowances as the sub-committee have thought fit, the sum advanced in each case being no more than sufficient to cover rent and maintenance. In the event of persons, however, being quarantined at the hospital as all their food is found for them, only such allowance has been made as would cover the rent, whilst in the event of clothes, bedding, &c., being destroyed fresh ones have been provided.
5. Persons whilst under quarantine observation are allowed to go about and are encouraged to take walks into the country, but are advised not to enter anybody's house, any public institution or meeting under penalty of forfeiting their monetary allowance
6. Quarantine wards within the same curtilage as small-pox wards may, in the opinion of some, be a source of danger to their inmates; this consideration, together with the largeness of the numbers to be dealt with has led me to watch the suspected people at their own homes.
7. Those inmates of infected houses who are willing are sent up to the hospital to have a disinfectant bath and to have their clothes stoved whilst their houses are fumigated wish sulphur meanwhile. Those persons who refuse to go up to the hospital have disinfectants given them and are asked to have a disinfectant bath at home.

Under conditions satisfactory to the Medical Officer of Health certain of the people from infected houses are allowed to continue at their work during the whole or part of their period of quarantine. In the case of a small-pox patient being a child recently attending school, the school manager is waited upon a list obtained of absentees who are then visited and the schoolroom if necessary fumigated. So, too, where the patient is at work in a factory or workshop, the names of the absentees from that factory or workshop are obtained and the absentees visited. The room or rooms in which the patient may have been at work, whilst in an infective stage, are, if thought necessary, fumigated.

14th June 1893.

The following letter from the Local Government Board is read:—

(Copy.)

Whitehall, S.W.,
29th May 1893.

Sir,

I am directed by the Local Government Board to advert to your letter of the 2nd instant with reference to the additional hospital accommodation proposed to be provided by the Town Council of Leicester.

The Board infer either that the reception of patients suffering from small-pox is contemplated in the new building which would be only 40 yards distant from the existing infectious diseases hospital or that the erection of the new building is concerned with the intended simultaneous reception in the hospital, of which this building will form a part, of cases of small-pox and cases of one or more other infectious diseases. Under these circumstances I am to point out that this is a course which in several instances during the prevalent epidemic of small-pox has been associated with the transmission of the disease to patients professedly under isolation for other infectious fevers. It has, moreover, been strongly condemned by the Royal Commission on Small-pox Hospitals, 1882. On page xxxii of the report made by that Commission the following paragraph appears: "It is evidently of paramount "importance that the areas of the small-pox wards as well "as their administration should be rigorously separated from "those of the fever hospitals, and further, that their "construction should be such as to reduce within the "smallest limits the chance of spreading infection."

If the Board were correct in their belief as to the object which the proposed building is intended to serve, I am to refer you to their letter of the 9th March and to say that they would not be prepared to sanction any loan in this case.

I am, Sir,
Your obedient Servant,
C. N. Dalton,
Assistant Secretary.

J. Storey, Esq.,
Town Clerk,
Leicester.

Resolved:

That the Town Clerk be requested to communicate with the Borough Members of Parliament asking them to speak with the President of the Local Government Board with a view to the holding of an inquiry in reference to the application made to the Board.

Resolved:

That it be left in the hands of the Chairman and the Medical Officer of Health to arrange for special accommodation for private patients suffering from small-pox if required and to fix a charge for their treatment.

31st July 1893.

Resolved:

That the small-pox cases now in the hospital be placed in the northern ward and that the vacated wards be made available for the reception of fever cases.

The sub-committee inspect the Hinckley Road site, the Beaumont Leys Farm site; some of the sub-committee visit the Leicester Frith site, and the Freake's Ground site; and the two sites on the Thurmaston Road are also visited.

Several other offers of land have been made as suitable sites for a new hospital.

11th October 1893.

Resolved:

That the sewage works and farms sub-committee be invited to meet the Sanitary Committee on Friday next at 4.30 to discuss the question of the proposed utilisation of land on Beaumont Leys as the site for a small-pox hospital.

§11. *Analytical Study of the Outbreak.*

The period embraced by this inquiry covers 70 weeks, reckoning from the week ending August 27th, 1892—the week in which arose the first case that came to the knowledge (subsequently) of the authorities. From that time, with but few exceptions, hardly a week elapsed without any cases arising, several of which were imported into the town, until the week ending December 23rd, 1893. In the subjoined table (and Chart III.) the number of persons attacked in each week is given, and also that of those who died, the deaths being those of the persons attacked in the week in question. The list includes not only the notified cases, but those which were not known to the authorities until later, and it comprises a total of 357, of whom 21 died.

TABLE XI.

LEICESTER, 1892-3.—WEEKLY INCIDENCE OF CASES OF SMALL-POX.

(*See also Chart III.*)*

—	Week ending—	Cases.	Deaths.
	1892.		
i	August 27	1	—
ii	September 3	—	—
iii	„ 10	3	1
iv	„ 17	—	—
v	„ 24	—	—
vi	October 1	1	—
vii	„ 8	1	—
viii	„ 15	2	—
ix	„ 22	2	—
x	„ 29	5	2
xi	November 5	5	1
xii	„ 12	1	1
xiii	„ 19	5	—
xiv	„ 26	2	—
xv	December 3	2	1
xvi	„ 10	3	—
xvii	„ 17	7	—
xviii	„ 24	2	—
xix	„ 31	6	—
	1893.		
xx	January 7	21	1
xxi	„ 14	11	—
xxii	„ 21	19	1
xxiii	„ 28	13	1
xxiv	February 4	12	1
xxv	„ 11	3	—
xxvi	„ 18	6	—
xxvii	„ 25	2	—
xxviii	March 4	5	—
xxix	„ 11	7	—
xxx	„ 18	2	—
xxxi	„ 25	5	—
xxxii	April 1	7	—
xxxiii	„ 8	7	—
xxxiv	„ 15	12	—
xxxv	„ 22	7	2
xxxvi	„ 29	10	1
xxxvii	May 6	7	1
xxxviii	„ 13	14	—
xxxix	„ 20	7	—
xl	„ 27	10	—
xli	June 3	10	1
xlii	„ 10	10	—
xliii	„ 17	19	—
xliv	„ 24	11	—
xlv	July 1	5	1
xlvi	„ 8	7	—
xlvii	„ 15	2	—
xlviii	„ 32	2	—
xlix	„ 29	6	—
l	August 5	2	—
li	„ 12	5	1
lii	„ 19	2	1
liii	„ 26	2	—
liv	September 2	2	—
lv	„ 9	2	—
lvi	„ 16	5	—
lvii	„ 23	5	—
lviii	„ 30	—	—
lix	October 7	2	—
lx	„ 14	3	—
lxi	„ 21	1	—
lxii	„ 28	2	1
lxiii	November 4	1	—
lxiv	„ 11	—	—
lxv	„ 18	2	—
lxvi	„ 25	5	1
lxvii	December 2	2	—
lxviii	„ 9	3	1
lxix	„ 16	2	—
lxx	„ 23	2	—
		357	21

In Table XII. the cases are distributed amongst the months of their incidence, and it will be seen that the outbreak attained its height in January 1893, but that the disease was also disproportionately prevalent in the months of May and June.

TABLE XII.

LEICESTER.—SMALL-POX, 1892-3.

Monthly Incidence. (CHART IV. A.)

N.B.—Cases entered in month of onset of illness.

—	Cases.	Deaths.
1892.		
August	1	—
September	5	1
October	10	2
November	13	2
December	18	1
1893.		
January	69	4
February	20	—
March	24	—
April	39	4
May	43	1
June	48	1
July	18	—
August	12	2
September	12	—
October	8	1
November	10	1
December	7	1
	357	21

Sex and Age.—The number of males attacked with small-pox was 181; of females, 176. The mortality, however, was far higher in the female sex, viz., 14 deaths, or nearly 8 per cent., as compared with 7 deaths, or 3·8 per cent. of the males.

TABLE XIII.

LEICESTER.—SMALL-POX, 1892-3.

TABLE SHOWING AGES OF THOSE ATTACKED IN EACH MONTH. (CHART IV. B.)

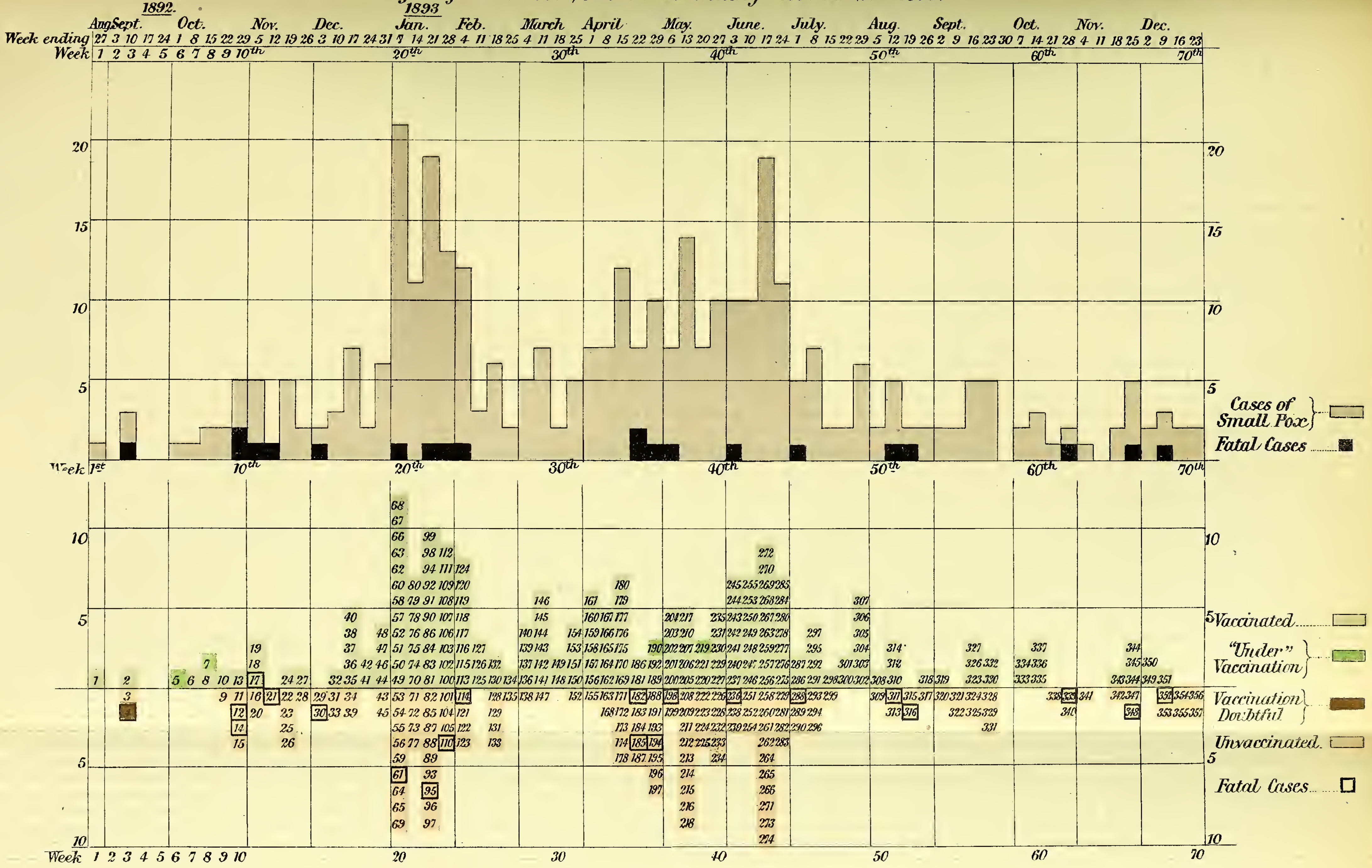
—	Under 1 Year.		1 to 10 Years.		10 to 30 Years.		30 Years and upwards.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
1892.								
August	—	—	—	—	—	—	1	—
September	1	—	—	—	2	—	2	1
October	—	—	6	2	2	—	2	—
November	—	—	7	1	1	—	5	1
December	—	—	6	1	8	—	4	—
1893.								
January	1	1	18	3	38	—	12	—
February	—	—	6	—	7	—	7	—
March	—	—	3	—	10	—	11	—
April	1	—	14	3	15	1	9	—
May	1	—	9	—	21	1	12	—
June	1	—	14	—	22	—	11	1
July	—	—	1	—	12	—	5	—
August	2	1	5	1	4	—	1	—
September	—	—	4	—	7	—	1	—
October	—	—	1	—	6	1	1	—
November	—	—	4	1	3	—	3	—
December	—	—	4	1	3	—	—	—
	7	2	102	13	161	3	87	3

---

* *Explanation of Chart III.:—*

This chart shows the number of cases (and deaths) arising in each week of the outbreak. In the lower portion of the chart the vaccination conditions are indicated. (See *Table* XVII).

shewing the Weekly Incidence of the Disease for 70 Weeks (from the Week ending August 27th 1892, to the Week ending December 23rd 1893.



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The age-distribution (see Tables XIII. and XIV.) shows that for both sexes—the largest number of cases in any decade—was from 0 to 10 years, viz., 109; the next at from 20 to 30, viz., 92; and the next from 10 to 20, viz., 69. In Table XIII. the relative monthly incidence of the disease amongst persons of different ages is shown, and (excluding August 1892) it will be found that, taking four periods of four months' each, the proportion of those attacked between the ages of 1 and 10 years was respectively 41·3 per cent., 26·9 per cent., 24·8 per cent., and 35·1 per cent., the preponderance at those ages during the first period being ascribable to the children who were infected in the hospital fever wards.

TABLE XIV.

SMALL-POX.—AGE AND SEX DISTRIBUTION.

—	Males.		Females.		Both Sexes.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Under 1 year	2	—	5	2	7	2
1 to 5 years	17	2	18	5	35	7
5 to 10 „	28	2	39	4	67	6
10 to 15 „	17	1	19	—	36	1
15 to 20 „	16	—	17	—	33	—
20 to 30 „	44	1	48	1	92	2
30 to 40 „	27	—	18	1	45	1
40 to 50 „	17	—	10	1	27	1
50 to 60 „	8	1	2	—	10	1
60 to 70 „	4	—	—	—	4	—
70 and over	1	—	—	—	1	—
	181	7	176	14	357	21

Stated in Age-periods, the above figures would run :—

—	Males.		Females.		Both Sexes.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
At ages under 1 year	2	0	5	2	7	2
„ 1 to 10 years	45	4	57	9	102	13
„ 10 to 30 „	77	2	84	1	161	3
„ 30 years and upwards	57	1	30	2	87	3
	181	7	176	14	357	21

Type of Attacks.—Of the whole number of cases 7 were regarded as *malignant* (hæmorrhagic type), all of which were fatal; 89 may be considered as of *confluent* type, 14 fatal, 56 as *coherent*, 78 as *discrete*, whilst in no fewer than 127 the disease was *mild* in its course and sparse in the eruption.

The per-centage distribution was, therefore, as follows :—

Malignant	1·9	per cent.
Confluent	24·9	„
Coherent	15·6	„
Discrete	21·8	„
Mild	35·5	„

It is of interest to note that, if the period (exclusive of August 1892) be divided into four terms of four months each, the severer cases—malignant and confluent—predominated in the first and last of these terms (*see* Table XV.), being 45·6 per cent., 19 per cent., 24·7 per cent., and 43·2 per cent. respectively. This variation bears some correspondence with the variation in incidence in children, already mentioned, for from Table XVI. it appears that the highest numbers, absolute and relative, of severe cases were met with in the young.

TABLE XV.

LEICESTER.—SMALL-POX, 1892–3.

TABLE SHOWING PROPORTIONATE TYPE OF DISEASE IN EACH MONTH. (CHART IV. C.)

—	Malignant.		Confluent.		Coherent.		Discrete.		Mild.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
1892.												
August	—	—	—	—	—	—	—	—	1	—	1	—
September	—	—	3	1	—	—	1	—	1	—	5	1
October	1	1	5	1	2	—	1	—	1	—	10	2
November	—	—	8	2	3	—	1	—	1	—	13	2
December	—	—	4	1	3	—	4	—	7	—	18	1
1893.												
January	1	1	13	3	10	—	13	—	32	—	69	4
February	—	—	4	—	4	—	3	—	9	—	20	—
March	—	—	2	—	2	—	9	—	11	—	24	—
April	2	2	7	2	9	—	10	—	11	—	39	4
May	1	1	10	—	9	—	11	—	12	—	43	1
June	—	—	12	1	6	—	14	—	16	—	48	1
July	—	—	2	—	5	—	4	—	7	—	18	—
August	—	—	5	2	—	—	2	—	5	—	12	2
September	—	—	5	—	—	—	1	—	6	—	12	—
October	—	—	2	1	—	—	2	—	4	—	8	1
November	1	1	4	—	2	—	1	—	2	—	10	1
December	1	1	3	—	1	—	1	—	1	—	7	1
	7	7	89	14	56	—	78	—	127	—	357	21

TABLE XVI.

TYPE OF SMALL-POX.—AGE DISTRIBUTION.

—	Malignant.		Confluent.		Coherent.		Discrete.		Mild.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Under 1 year	1	1	2	1	3	—	—	—	1	—	7	2
1–5	2	2	17	5	8	—	4	—	4	—	35	7
5–10	2	2	30	4	12	—	16	—	7	—	67	6
10–15	1	1	9	—	7	—	9	—	10	—	36	1
15–20	—	—	6	—	3	—	4	—	20	—	33	—
20–30	1	1	11	1	10	—	19	—	51	—	92	2
30–40	—	—	7	1	6	—	17	—	15	—	45	1
40–50	—	—	6	1	4	—	4	—	13	—	27	1
50–60	—	—	1	1	3	—	2	—	4	—	10	1
60–70	—	—	—	—	—	—	3	—	1	—	4	—
70 and over	—	—	—	—	—	—	—	—	1	—	1	—
	7	7	89	14	56	—	78	—	127	—	357	21

Thus at ages :—

—	Under 1 Year.	1 to 10 Years.	10 to 30 Years.	30 Years and upwards.
	Per cent.	Per cent.	Per cent.	Per cent.
Malignant	1 or 14·3	4 or 3·9	2 or 1·2	0 —
Confluent	2 or 28·6	47 or 46·0	26 or 16·1	14 or 16·1
Coherent	3 or 42·8	20 or 19·6	20 or 12·4	13 or 15·0
Discrete	0 —	20 or 19·6	32 or 19·9	26 or 29·8
Mild	1 or 14·3	11 or 10·7	81 or 50·3	34 or 39·1
	7	102	161	87

Vaccination Data of those Attacked with Small-pox.

In Table XVII. and Chart II. the weekly totals are divided into four categories, according to the condition of the subjects *quâ* vaccination. These categories consist of (*a*) those presenting evidence of having been vaccinated; (*b*) those undergoing primary vaccination when attacked; (*c*) where the fact of vaccination was uncertain or doubtful; and (*d*) the unvaccinated.

TABLE XVII.

VACCINATION DATA OF CASES arising in each Week.

(CHART III.)

Week.	Vaccinated.		Under-Vaccination.		Doubtful Vaccination.		Un-vaccinated.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
i	1	—	—	—	—	—	—	—
ii	—	—	—	—	—	—	—	—
iii	1	—	—	—	1	1	1	—
iv	—	—	—	—	—	—	—	—
v	—	—	—	—	—	—	—	—
vi	—	—	1	—	—	—	—	—
vii	1	—	—	—	—	—	—	—
viii	1	—	1	—	—	—	—	—
ix	1	—	—	—	—	—	1	—
x	1	—	—	—	—	—	4	2
xi	3	1	—	—	—	—	2	—
xii	—	—	—	—	—	—	1	1
xiii	1	—	—	—	—	—	4	—
xiv	1	—	—	—	—	—	1	—
xv	—	—	—	—	—	—	2	1
xvi	1	—	—	—	—	—	2	—
xvii	5	—	—	—	—	—	2	—
xviii	2	—	—	—	—	—	—	—
xix	4	—	—	—	—	—	2	—
xx	12	—	—	—	—	—	9	1
xxi	7	—	—	—	—	—	4	—
xxii	10	—	—	—	—	—	9	1
xxiii	9	—	—	—	—	—	4	1
xxiv	8	—	—	—	—	—	4	1
xxv	3	—	—	—	—	—	—	—
xxvi	2	—	—	—	—	—	4	—
xxvii	1	—	—	—	—	—	1	—
xxviii	4	—	—	—	—	—	1	—
xxix	6	—	—	—	—	—	1	—
xxx	2	—	—	—	—	—	—	—
xxxi	4	—	—	—	—	—	1	—
xxxii	6	—	—	—	—	—	1	—
xxxiii	5	—	—	—	—	—	2	—
xxxiv	7	—	—	—	—	—	5	—
xxxv	2	—	—	—	—	—	5	
xxxvi	2	—	1	—	—	—	7	1
xxxvii	5	—	—	—	—	—	2	1
xxxviii	5	—	—	—	—	—	9	—
xxxix	2	—	1	—	—	—	4	—
xl	5	—	—	—	—	—	5	—
xli	7	—	—	—	—	—	3	1
xlii	7	—	—	—	—	—	3	—
xliii	9	—	—	—	—	—	10	—
xliv	7	—	—	—	—	—	4	—
xlv	2	—	—	—	—	—	3	1
xlvi	4	—	—	—	—	—	3	—
xlvii	1	—	—	—	—	—	1	—
xlviii	2	—	—	—	—	—	—	—
xlix	6	—	—	—	—	—	—	—
l	1	—	—	—	—	—	1	—
li	3	—	—	—	—	—	2	1
lii	—	—	—	—	—	—	2	1
liii	1	—	—	—	—	—	1	—
liv	1	—	—	—	—	—	1	—
lv	—	—	—	—	—	—	2	—
lvi	3	—	—	—	—	—	2	—
lvii	2	—	—	—	—	—	3	—
lviii	—	—	—	—	—	—	—	—
lix	2	—	—	—	—	—	—	—
lx	3	—	—	—	—	—	—	—
lxi	—	—	—	—	—	—	1	—
lxii	—	—	—	—	—	—	2	1
lxiii	—	—	—	—	—	—	1	—
lxiv	—	—	—	—	—	—	—	—
lxv	1	—	—	—	—	—	1	—
lxvi	3	—	—	—	—	—	2	1
lxvii	2	—	—	—	—	—	—	—
lxviii	1	—	—	—	—	—	2	1
lxix	—	—	—	—	—	—	2	—
lxx	—	—	—	—	—	—	2	—
	198	1	4	—	1	1	154	19

Thus the vaccinated numbered 198, or 55·4 per cent. of all attacked; those "under vaccination," 4, or 1·1 per cent.; "doubtful" vaccination, 1, or 0·2 per cent.; unvaccinated, 154, or 43·1 per cent.

The mortality amongst the vaccinated was 0·8 per cent.; amongst the unvaccinated, 12·3 per cent. The single case in which the fact of vaccination was doubtful proved fatal (No. 4, v. *ante*). There were no deaths amongst the four who were "under" vaccination.

TABLE XVIII.

LEICESTER.—SMALL-POX, 1892–3.

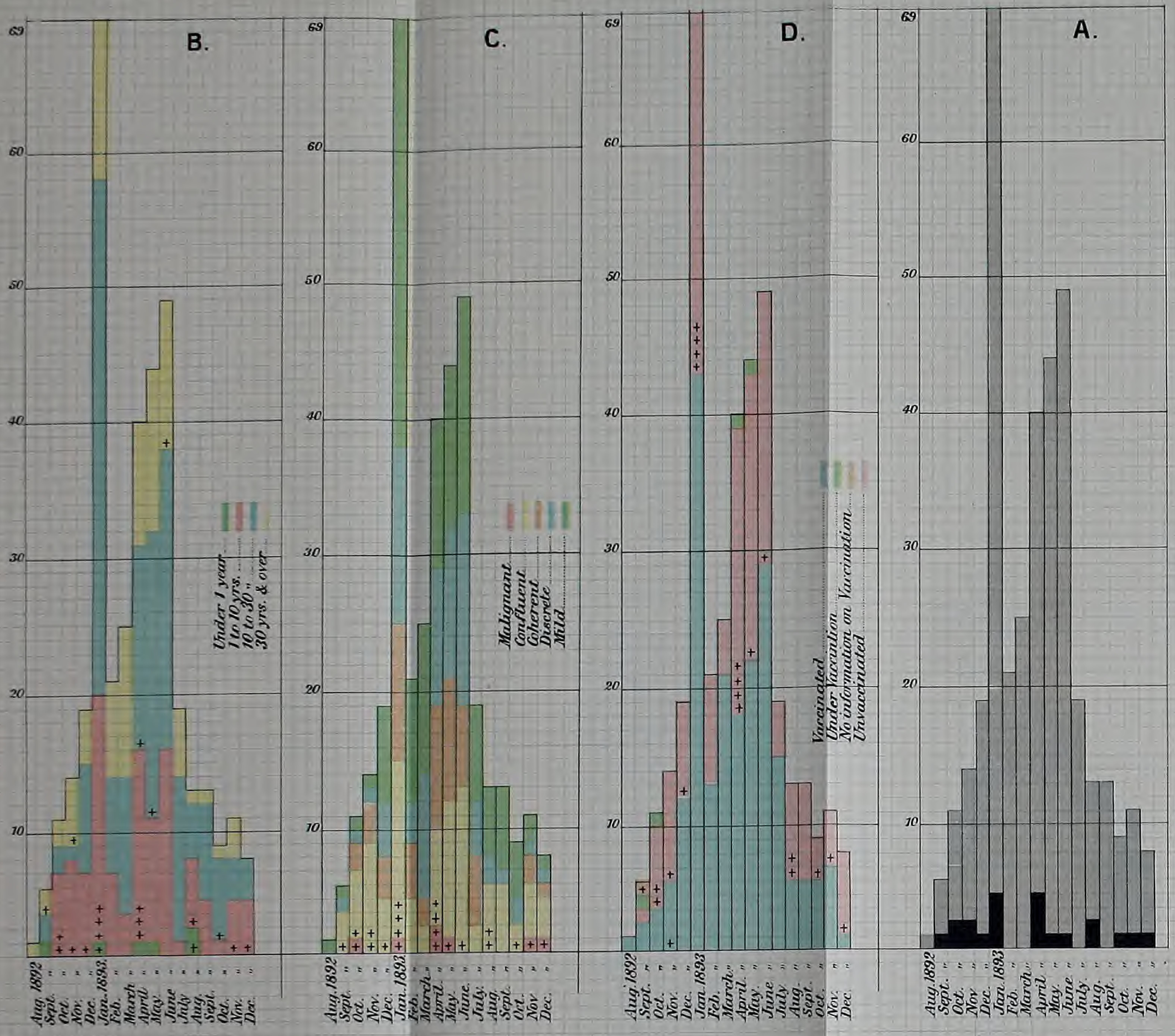
MONTHLY INCIDENCE.—VACCINATION DATA.

(CHART IV. D.)

Month.	Vaccinated		Under Vacci-nation.		Doubtful Vacci-nation.		Un-vacci-nated.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
1892. August - -	1	—	—	—	—	—	—	—
September - -	2	—	1	—	1	1	1	—
October - -	3	—	1	—	—	—	6	2
November - -	5	1	—	—	—	—	8	1
December - -	11	—	—	—	—	—	7	1
1893. January - -	42	—	—	—	—	—	27	4
February - -	12	—	—	—	—	—	8	—
March - -	20	—	—	—	—	—	4	—
April - -	17	—	1	—	—	—	21	4
May - -	21	—	1	—	—	—	21	1
June - -	28	—	—	—	—	—	20	1
July - -	14	—	—	—	—	—	4	—
August - -	5	—	—	—	—	—	7	2
September - -	5	—	—	—	—	—	7	—
October - -	5	—	—	—	—	—	3	1
November - -	6	—	—	—	—	—	4	1
December - -	1	—	—	—	—	—	6	1
	198	1	4	—	1	1	154	19

Explanation of Chart IV:—

In this chart the monthly distribution of the cases of small-pox is represented. A.—Total numbers and mortality. B.—Numbers at different age-periods. C.—Numbers of different types of the disease. D. Numbers vaccinated and unvaccinated. The fatal cases in B., C., and D., shown by the sign +.



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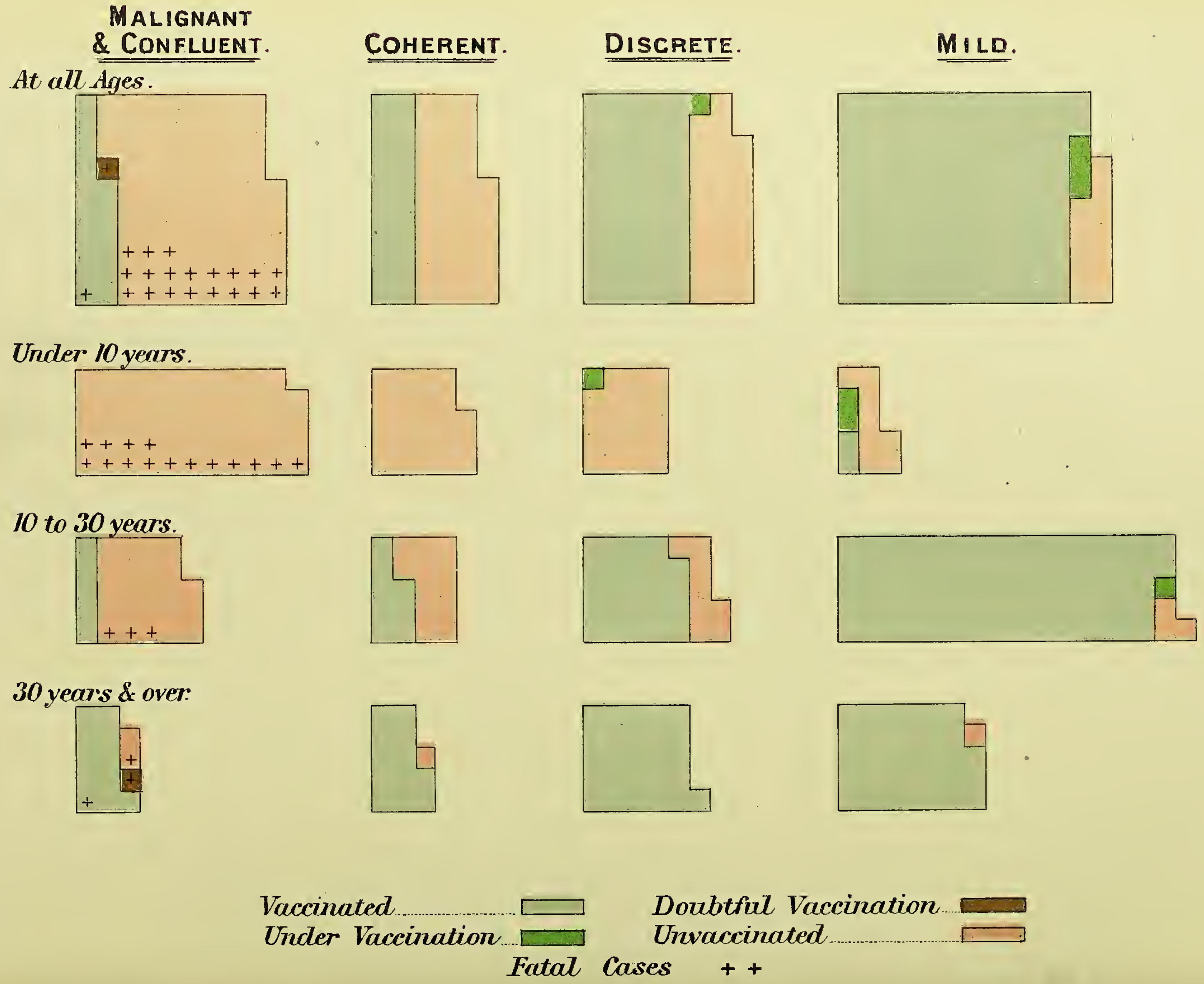
LEICESTER, 1892-93.

Type and Fatality of Small Pox in regard to Age & Vaccination



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In Table XVIII. the data furnished in Table XVII. are arranged in the months of the occurrence of the cases.

Dividing the whole period—September 1892 to December 1893—into four terms of four months each, it will be found that the proportion of vaccinated and unvaccinated in each term was as follows:—Vaccinated, 45·6 per cent., 60 per cent., 56 per cent., and 46 per cent.; unvaccinated, 48 per cent., 39·4 per cent., 43 per cent., and 54 per cent.

§12. *Vaccination in Relation to Type of Attack.*

In Tables XIX. and XX. and Chart V. the facts as to the relative incidence of the different forms of small-pox in the various classes of vaccinated and unvaccinated are set forth. These figures show that in children, who, with four exceptions, were all unvaccinated, the proportion of severe cases was very much higher than in adults, amongst whom the proportions of vaccinated and unvaccinated were almost reversed; and that above the age of 30 twice as many confluent cases occurred amongst the vaccinated class than below that age.

TABLE XIX.
CASES OF SMALL-POX.
AGE AND VACCINATION.

—	Vaccinated.		Under Vaccination.		Doubtful Vaccination.		Unvaccinated.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Under 1 year	—	—	1	—	—	—	6	2	7	2
1 to 5 years	—	—	1	—	—	—	34	7	35	7
5 „ 10 „	2	—	1	—	—	—	64	6	67	6
10 „ 15 „	9	—	—	—	—	—	27	1	36	1
15 „ 20 „	24	—	1	—	—	—	8	—	33	—
20 „ 30 „	81	—	—	—	—	—	11	2	92	2
30 „ 40 „	44	—	—	—	—	—	1	1	45	1
40 „ 50 „	24	1	—	—	—	—	3	—	27	1
50 „ 60 „	9	—	—	—	1	1	—	—	10	1
60 „ 70 „	4	—	—	—	—	—	—	—	5	—
70 and over	1	—	—	—	—	—	—	—	1	—
	198	1	4	—	1	1	154	19	357	21

TABLE XX.
VACCINATION and TYPE of SMALL-POX.

—	Vaccinated.					Under Vaccination.					Doubtful Vaccination.					Un-vaccinated.					Total.					—
	Malignant.	Confluent.	Coherent.	Discrete.	Mild.	Malignant.	Confluent.	Coherent.	Discrete.	Mild.	Malignant.	Confluent.	Coherent.	Discrete.	Mild.	Malignant.	Confluent.	Coherent.	Discrete.	Mild.	Malignant.	Confluent.	Coherent.	Discrete.	Mild.	
Under 1 year										1						1	2	3			1	2	3		1	7
1 to 5										1						2	17	8	4	3	2	17	8	4	4	35
5 „ 10					2				1							2	30	12	15	5	2	30	12	16	7	67
10 „ 15				2	7											1	9	7	7	3	1	9	7	9	10	36
15 „ 20		1	1	3	19					1							5	2	1			6	3	4	20	33
20 „ 30		4	7	19	51											1	7	3			1	11	10	19	51	92
30 „ 40		6	6	17	15												1					7	6	17	15	45
40 „ 50		5	3	4	12												1	1		1		6	4	4	13	27
50 „ 60			3	2	4							1										1	3	2	4	10
60 „ 70				3	1																			3	1	4
70 and over					1																				1	1
	—	16	20	50	112				1	3		1				7	72	36	27	12	7	89	56	78	127	357

And stated in age periods (*see* Chart IV.):—

TABLE XX. A.

—	Vaccinated.		Under Vaccination.		Doubtful Vaccination.		Unvaccinated.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
0 *to* 10 *years*:—										
Malignant	—	—	—	—	—	—	5	5	5	5
Confluent	—	—	—	—	—	—	49	10	49	10
Coherent	—	—	—	—	—	—	23	—	23	—
Discrete	—	—	1	—	—	—	19	—	20	—
Mild	2	—	2	—	—	—	8	—	12	—
	2	—	3	—	—	—	104	15	109	15
10 *to* 30 *years*:—										
Malignant	—	—	—	—	—	—	2	2	2	2
Confluent	5	—	—	—	—	—	21	1	26	1
Coherent	8	—	—	—	—	—	12	—	20	—
Discrete	24	—	—	—	—	—	8	—	32	—
Mild	77	—	1	—	—	—	3	—	81	—
	114	—	1	—	—	—	46	3	161	3

Explanation of Chart V.:—
This Chart shows the absolute number of cases of each type in each class.

Table XX A.—*continued.*

—	Vaccinated.		Under Vaccination.		Doubtful Vaccination.		Unvaccinated.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
30 *years and over* :—										
Malignant - - -	—	—	—	—	—	—	—	—	—	—
Confluent - - -	11	1	—	—	1	1	2	1	14	3
Coherent - - -	12	—	—	—	—	—	1	—	13	—
Discrete - - -	26	—	—	—	—	—	—	—	26	—
Mild - - -	33	—	—	—	—	—	1	—	34	—
	82	1	—	—	1	1	4	1	87	3
At all ages :—										
Malignant - - -	—	—	—	—	—	—	7	7	7	7
Confluent - - -	16	1	—	—	1	1	72	12	89	14
Coherent - - -	20	—	—	—	—	—	36	—	56	—
Discrete - - -	50	—	1	—	—	—	27	—	78	—
Mild - - -	112	—	3	—	—	—	12	—	127	—
	198	1	4	—	1	1	154	19	357	21

Comparison of Vaccinated and Unvaccinated as to Type of Attack.

In analysing the proportionate distribution of the cases of small-pox at different age-periods, we have the following results, which are represented diagrammatically on the accompanying plan (Chart VI.) :—

Vaccinated Class (198 Cases).

Type of Small-pox.	Under 10 Years.	10 to 30 Years.	30 Years and upwards.	At all Ages.
Confluent -	—	5 or 4·4 p.c.	11 or 13·4 p.c.	16 or 8·0 p.c.
Coherent -	—	8 „ 7·0 „	12 „ 14·6 „	20 „ 10·1 „
Discrete -	—	24 „ 21·0 „	26 „ 31·7 „	50 „ 25·2 „
Mild - -	2 or 100 p.c.	77 „ 67·5 „	33 „ 40·2 „	112 „ 56.5 „
	2	114	82	198

Of this total, 182 have the number of primary vaccination cicatrices recorded—viz. : 6 with 1 cicatrix, 42 with 2 cicatrices, 64 with 3 cicatrices, and 70 with 4 or more cicatrices.

Having One Primary Vaccination Cicatrix (6 Cases).

Type of Small-pox.	Under 10 Years.	10 to 30 Years.	30 Years and upwards.	At all Ages.
Confluent -	No Cases.	1 or 20·0 p.c.	—	1 or 16·6 p.c.
Coherent -		1 „ 20·0 „	—	1 „ 16·6 „
Discrete -		1 „ 20·0 „	—	1 „ 16·6 „
Mild - -		2 „ 40·0 „	1 or 100 p.c.	3 „ 50·0 „
		5	1	6 „ 50·0 „

Having Two Primary Vaccination Cicatrices (42 Cases).

Type of Small-pox.	Under 10 Years.	10 or 30 Years.	30 Years and upwards.	At all Ages.
Confluent -	No Cases.	2 or 8·7 p.c.	6 or 31·6 p.c.	8 or 19·0 p.c.
Coherent -		—	3 „ 15·8 „	3 „ 7·0 „
Discrete -		5 „ 21·7 „	6 „ 31·6 „	11 „ 26·2 „
Mild - -		16 „ 69·5 „	4 „ 21·0 „	20 „ 47·6 „
		23	19	42

Having Three Primary Vaccination Cicatrices (64 Cases).

Type of Small-pox.	Under 10 Years.	10 to 30 Years.	30 Years and upwards.	At all Ages.
Confluent -	No Cases.	1 or 3·4 p.c.	4 or 11·4 p.c.	5 or 7·8 p.c.
Coherent -		4 „ 13·8 „	6 „ 17·1 „	10 „ 15·6 „
Discrete -		6 „ 20·0 „	13 „ 37·0 „	19 „ 29·7 „
Mild - -		18 „ 62·1 „	12 „ 34·3 „	30 „ 46·9 „
		29	35	64

Explanation of Chart VI. :—
This chart shows the proportion of cases of small-pox of different types, at different ages in the vaccinated and unvaccinated respectively.

Having Four or more Primary Vaccination Cicatrices (70 Cases).

Type of Small-pox.	Under 10 Years.	10 to 30 Years.	30 Years and upwards.	At all Ages.
Confluent -	—	1 or 1·9 p.c.	1 or 6·0 p.c.	2 or 2·8 p.c.
Coherent -	—	3 „ 5·9 „	3 „ 17·6 „	6 „ 8·5 „
Discrete -	—	11 „ 21·5 „	5 „ 29·4 „	16 „ 22·8 „
Mild - -	2	36 „ 70·6 „	8 „ 47·0 „	46 „ 65·7 „
		51	17	70

These figures, small as they are, show a general proclivity to a greater proportion of severe cases beyond the age of 30 years than below it; and also a diminishing ratio of these severe cases in each age-period *pari passu* with an increase in the number of vaccination cicatrices.

These results may be contrasted with those yielded by a similar analysis of the unvaccinated subjects.

Unvaccinated Class (154 Cases).

Type of Small-pox.	Under 10 Years.	10 to 30 Years.	30 Years and upwards.	At all Ages.
Confluent and Malignant.	54 or 51·9 p.c.	23 or 50·0 p.c.	2 or 50·0 p.c.	79 or 51·3 p.e.
Coherent -	23 „ 22·1 „	12 „ 26·1 „	1 „ 25·0 „	36 „ 23·3 „
Discrete -	19 „ 18·2 „	8 „ 17·4 „	—	27 „ 17·5 „
Mild - -	8 „ 7·7 „	3 „ 6·5 „	1 „ 25·0 „	12 „ 7·7 „
	104	46	4	154

Here we find a rather striking uniformity in the distribution of the types of small-pox at different age-periods, viz., about one-half being confluent (and malignant), one-fourth coherent, one-sixth discrete, and one-twelfth of the mildest type.

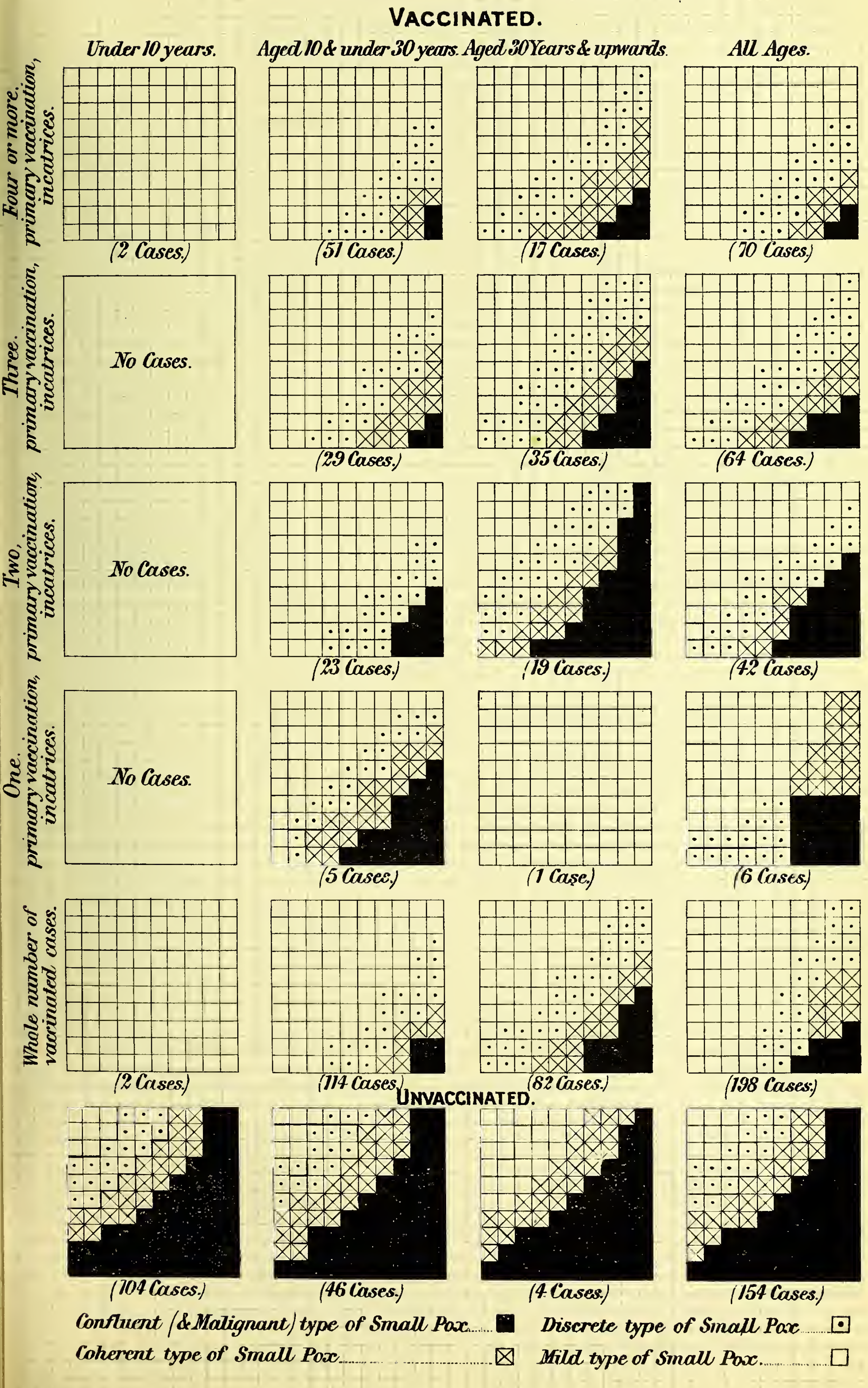
Houses invaded by Small-pox.

The following list of the houses invaded by small-pox supplements the information already furnished in the Table of Cases and the particulars of the outbreak. This list has been prepared in part from returns furnished to me of the names and ages of every inmate of an infected house with particulars as to their vaccination; and in part from a personal inspection of the houses which I made at the close of the inquiry, in company with the chief sanitary inspector, Mr. Braley. It will be seen from the brief notes which are appended that the majority of the dwellings inspected were in a good sanitary state, and in but a few was there any over-crowding of the inmates.

I have taken for purposes of analysis 193 of these households, comprising 1,234 inhabitants; the reason for this selection being the lack of information regarding the five others, Nos. 1, 7, 8, 47, and 71. Moreover three of them were common lodging-houses, the largest of which was No. 7, into which small-pox was introduced on two occasions, the total number of cases occurring in this place being 12. Ten cases were sent from the workhouse, and 11, which arose at the hospital, were retained there and did not return to their homes. Thirty-six cases are thus accounted for, leaving 321 in connexion with the 193 households analysed; but one of these cases was admitted into hospital twice (viz., house No. 36, case 60 (and 111)), having apparently been re-infected.

Thus we have 193 houses with 1,234 inmates, of whom 320 were attacked.

DIAGRAM, *showing the Proportion of Cases, of Small Pox, of different Types which occurred in Vaccinated and Unvaccinated Persons at all and certain Specified Ages.*



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§13. LEICESTER.—SMALL-POX, 1892–3.

LIST of HOUSES INVADED, with DETAILS as to VACCINATION of their INMATES.

Ref. to House List.	Street.	Date of Infection.	Inmates.				Attacked with Small-Pox.*				Persons quarantined at Hospital.	Sanitary Condition of House, &c.
			Vaccinated.	No Information as to Vaccination.	Under Vaccination.	Unvaccinated.	Vaccinated.	No Information as to Vaccination.	Under Vaccination.	Unvaccinated.		
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1	Workhouse and Britannia Street, Court E.	1892. Aug. 21 -	—	—	—	—	1					Large ill-paved court; open ashpit; pail clean; 2 rooms, old.
2	„ „ -	Sept. 4 -	2				2				6	4 rooms; old house; open ashpit; pail clean.
3	„ Court A.	„ 5 -	1		1	1			5	3	2	Old 2-roomed dwelling; neglected; recent privies.
	Workhouse Infirmary.		—	—	—	—		**4**				
4	Elm Street - -	„ 28 -	4		2		6		7		5	4 rooms, fairly clean; w.c.; covered ashpit.
5	Crane Street -	Oct. 12 -	3				8				5	4 rooms, clean; new buildings; w.c.; yard to 5 houses.
6	„ „ -	„ 17 -	4			1				9	5	Do. do. do.
7	Lee Street, C. L. H.	„ 18 -	—	—	—	—	10, 19, 62, 78, 109, 112, 132, 141, 142, 144, 145, 151.				1	
	Fever Hospital -	„ 26 -	—	—	—	—	37, 66, 106, 200.			11, **12**, **14**, 15, 16, **21**, 25.		
8	Newport Street -	„ 27 -					13					6 rooms; w.c.; water supply good.
9	Caroline Street -	Nov. 2 -	3				**17**				2	Small house in large well-paved court; pail system; good water supply.
10	Mansfield Street -	„ 3 -	3			1	18				3	Large court to 2 houses; 4 rooms; pail system; open ashpit.
11	Peel Street - -	„ 3 -	4			1				20	6	Large well-paved yard, clean; 4 rooms; pail system; open ashpit.
	Workhouse - -	„ 12 -	—	—	—	—	35, 68, 99, 118, 125, 146, 154.			22		
12	Kent Street -	„ 13 -	4			3	32			23	10	House not visited.
13	Garfield Street -	„ 14 -	10			1	24				10	Wide well-paved street; 7 rooms in house; clean; water supply good; w.c.
14	Nelson Street -	„ 18 -	5			3				26, 31.	7	Small yard to 2 houses; 4 rooms; pail system; open ashpit.
15	Brookhouse Avenue	„ 19 -	2		1		27					Good house, about 7 rooms; w.c. outside; water supply good.
16	Preston Street -	„ 23 -	5			3				28	7	Yard to 2 houses; 6 rooms; w.c.
17	Stanley Street -	„ 29 -	3		3	1	36			29		House not visited.
18	Milton Street -	Dec. 2 -	7			3				**30**	9	Clean, well kept; 6 rooms; w.c. and urinal in court.
19	Beatrice Road -	„ 10 -	4			2	44			33, 59.	6	6 rooms recently built; good condition; open site.
20	Norfolk Street -	„ 11 -	2			11				34, 77, **114**, 122, 123, 128.		Good; clean; garden at back.
21	Braunstone Gate -	„ 15 -	8			2	38, 67, 94.			53, **61**.		Large house of good class; w.c. within and without; bath room.
22	Baker Street -	„ 15 -	5			2	48			39, 43.	1	Ill-paved street; narrow yard; small house; fair; pail system.
23	Alexandra Street -	„ 20 -	5				40, 51, 52, 92.				4	4 houses in well-paved yard; pail system; open ashpit; house fairly clean.
24	Pool Road - -	„ 23 -	2			2	41, 98.			65, 96.		New 6-roomed house; clean; w.c.; covered ashpit; water supply good.
25	Harrison Street -	„ 30 -	3			1	42				3	6 rooms; clean; paved yard; w.c.; dustbins.
26	Mansfield Street -	„ 31 -	3			6				45, 64, 82, 85, 87.	7	Large yard in front; good buildings; clean; well kept.
27	Western Road -	„ 31 -				4	46					New house; in good sanitary condition.
28	Dryden Street -	„ 31 -	3		1		47, 84					One of 8 houses in yard; 4 rooms; open ash-pit.
29	Western Road -	1893. Jan. 1 -	6				49, 81					One of 7 houses in row; old poor ventilation; pails.
30	Fitzroy Street -	„ 2 -	7	1		2	50					Yard to 4 houses; 4 rooms; pail system; dustbins.
31	Wharf Street -	„ 3 -	5			1				54		New house; shop; good sanitary state.
32	Samuel Street -	„ 3 -	5			3	90, 91			55, 93, 101	3	Yard to 5 houses; 4 rooms; pails, dust bin.
33	Metcalf Street -	„ 4 -	1			3				56, 89		Old street; 5 houses in yard; open ash-pit; ill-kept garden; pails.
34	Baker Street -	„ 4 -	5		3		57				7	As No. 22, but ill-kept.
35	Pasture Lane -	„ 4 -	8				58					Small paved court; neglected; dirty; pails.
36	Abbey Lane - -	„ 5 -	5			1	60 (111)				5	6 rooms; w.c.; clean and sanitary.
37	Bede Street - -	„ 5 -	7				63					New well-kept house.
38	Beatrice Road -	„ 7 -	1			7				69		6 rooms; w.c.; garden; good state.
39	Woodby Street -	„ 8 -	4				70				3	Yard to 6 houses; low built; ill-ventilated.
40	Banford Street -	„ 8 -	3			2				71	9	Not seen.
41	Flint Street - -	„ 9 -	4			3	126			72, 104	5	Yard to 6 houses; ill-drained; w.c.; dustbins.
42	Little Holm Street -	„ 9 -	2	1		4				73	5	New house; good work.
43	Littleton Street -	„ 9 -	7			4	74				10	6 rooms; yard dirty; pails; dustbin.

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* The figures in these columns refer to Table of Cases. Those in leaded type are fatal cases.

TABLE of HOUSES INVADED, with DETAILS as to VACCINATION of their INMATES—*continued.*

Ref. to House List.	Street.	Date of Infection.	Inmates.				Attacked with Small-Pox.*				Persons quarantined at Hospital.	Sanitary Condition of House, &c.
			Vaccinated.	No Information as to Vaccination.	Under Vaccination.	Unvaccinated.	Vaccinated.	No Information as to Vaccination.	Under Vaccination.	Unvaccinated.		
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
44	Bath Street	1893. Jan. 9	8			1	75					Yard not paved; ill-drained; old ill-kept house.
45	Baker Street	„ 9	3			3	76				5	House had been pulled down when place visited.
46	High Cross Street	„ 13	4		1		79					Not visited.
47	Brittania Street, C.L.H,	„ 13	—	—	—	—	80					Lodging-house (52 males); small yard; 3 w.c.'s.
48	Curzon Street	„ 16	3				83					6 rooms; cleanly; well kept; w.c.; dustbin.
49	Heanor Street	„ 17	8			1	86					6 rooms; cleanly; well kept; w.c.; dustbin.
50	Grant Street	„ 17	5			3	119, 124			88	7	Rooms 3; ill-kept.
51	Burgess Street	„ 19	3			1				**95**		4 houses to yard; small and low; w.c.; ash-pit.
52	Metcalf Street	„ 20	3			6				97	8	See No. 33.
53	Argyll Street	„ 22	6			1	100				6	Yard to 4 houses; yard neglected; house fair; pails; open ashpit.
54	Dorset Street	„ 22	2			5	102				6	Yard to 4 houses; w.c.; dustbin; fair.
55	Sanvey Gate	„ 22	2			3	103					Confined court; dirty house; low rooms; pail system; dustbins.
56	Archdeacon Lane	„ 23	1			1				105		Old back-to-back house; ill-kept and dirty; pails.
57	Grundon Street	„ 26	5				107					On riverside; paved yard; pails; open ashpit; fairly kept.
58	Brandon Steeet	„ 27	6				108					6 rooms; good condition.
59	Blackfriars Street	„ 28	2			3	130			**110**	4	Court with several houses; pail system; open ashpit.
60	Salisbury Road	„ 29	18		1		113					Not visited.
61	Alice Street	„ 31	2				115					4 houses to yard; rather dirty; 2 w.c.'s.
62	Brandon Street	„ 31	2		1		116					As No. 28.
63	Pingle Street	Feb. 3	2			3	120				4	Paved yard to 5 houses; garden behind; good.
64	Coventry Street	Jan. 31	6				117					Yard to 2 houses; 9 rooms; fair; w.c.
65	Brandon Terrace	Feb. 4	2		2	3				121, 131		7 rooms; good sanitary state.
66	Curley Street	„ 11	5			1	127				5	Yard to 3 houses; garden plots; pails; open ashpit.
67	Dorset Street	„ 12	2			5	136			129	6	6 rooms; rather dirty; pails; small yard.
68	Gosling Street	„ 18	2			1	143			133		Not seen.
69	Brandon Street	„ 23	3			2	134, 148, 153			147, 152		As No. 58.
70	Buckingham Street	„ 25				5				135, 155	7	Yard to 6 houses; good sanitary state.
71	Britannia Street, C.L.H.	March 1	—	—	—	—	137					Lodging-house; fairly new; small yard; w.c.
72	Moreton Road	„ 1	4			2				138		5 rooms; clean; fairly new; pails.
73	Victoria Avenue	„ 2	9		1		139, 140					Not visited.
74	Bath Street	„ 19	6				149, 156, 161					Large yard and stores; roomy; well kept.
75	Arthur Street	„ 21	10				150					Clean; good sanitary state.
76	Ruby Street	„ 27	3			2	157					Ditto.
77	Martin Street	„ 27	7			1	158, 177			168	5	Yard to 2 houses; clean; good state.
78	Abbey Lane	„ 28	6			1	159					Old buildings; well marked; pails.
79	All Saints' Road	„ 29	3			1	160					Yard to 4 houses; pails; fair.
80	Court D, Burley's Lane.	April 2	2			1	162				1	2 rooms; no back; side of court; pails; open ashpit.
81	Court A, Woodley Street.	„ 3	1			5				163, **185**	5	Court with 10 houses; no backs; pails.
82	Gresham Street	„ 3	2			3	164			183, 197		6 rooms; w.c.; ashpits in yards.
83	Belper Street	„ 4	3		2	2	165, 179		190	173, 174	1	6 rooms; new house; very clean w.c.
84	Hinckley Road	„ 5	8			2	166, 186			**182,** 187		7 rooms; well kept; w.c. in yard.
85	Vernon Road	„ 7	5				167, 169, 170				2	Not seen.
86	Rolleston Street	„ 10	2			4	189			171, 172, 193.		Unpaved yard; pails; 6 rooms; wash-house.
87	Burgrave Street	„ 10	3			2	175, 237			258		Fairly new; well kept; sanitary.
88	Court A., Bath Street	„ 11	2			2	176					Old house; 3 rooms; w.c.; paved court.
89	Cromwell Road	„ 13	2			4				178		Not seen.
90	Knighton Church Road.	„ 14	4			3	180			**194, 198.**		Do.
91	Hazel Street	„ 16	6			3	181					Do.
92	Titchborne Street	„ 17	1			2				184		Large yard to 4 houses; w.c.; dustbin; good drainage.
93	Simpson Street	„ 23	3			2				188		Yard to 5 houses; house fairly clean; pails.
94	Gold Street	„ 25	2			6				191, 209, 218.		Yard to 3 houses; 5 rooms; fair; pails.
95	Granby Avenue	„ 25	8				192, 204					Good; clean; 6 rooms; at back of Burgrave Street.
96	Queen Street	„ 27	1	1		2				195		4 houses to yard; spring water; pails well kept.
97	Victoria Road	„ 28	3			4				196, 222, 223.		Shop; 6 rooms: w.c.

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* The figures in these columns refer to Table of Cases. Those in leaded type are fatal cases.

Table of Houses Invaded, with Details as to Vaccination of their Inmates—*continued.*

Ref. to House List.	Street.	Date of Infection.	Inmates.				Attacked with Small-Pox.*				Persons quarantined at Hospital.	Sanitary Condition of House, &c.
			Vaccinated.	No Information as to Vaccination.	Under Vaccination.	Unvaccinated.	Vaccinated.	No Information as to Vaccination.	Under Vaccination.	Unvaccinated.		
1	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
		1893.										
98	Ruby Street - -	April 30 -	5			4	220			199		Clean; garden; wash-house; w.c.
99	Ridley Street -	May 2 -	11			2	201					New built; 6 rooms; w.c.
100	Court D, Burley's Lane.	„ 3 -	3				202					Yard at back full of outbuildings; old; neglected; pails.
101	Mitre and Keys Yard.	„ 5 -	4			1	203					Old, but clean house; small rooms; pails; open ashpit.
102	Mere Road - -	„ 8 -	4			3	205					Good; very clean; on rising ground.
103	Harrison Street -	„ 8 -	3				206					Well kept; 6 rooms; w.c.
104	Sheridan Road -	„ 8 -	5		4		207, 217		219			Not seen.
105	Victorfa Road -	„ 10 -	3	1		3				208	6	Yard to 4 houses; ill-kept.
106	Blue Boar Lane -	„ 10 -	4			1	210					Yard to 3 houses; pails; fair.
107	Ashleigh Road -	„ 10 -	3			1				211		Detached house (not visited).
108	Grundon Street -	„ 11 -	3			4				212		Old, but clean; open ditch at back.
109	Abbey Street (L.H.)	„ 11 -	5			3				213, 238	1	Old; low rooms; 5 houses to yard; pails; rooms dirty.
110	Charlotte Street -	„ 11 -	5			2				214		Corner house (inn); fairly well kept.
111	Wand Street -	„ 11 -	2			7				215	8	6 rooms; separate yard; w.c.
112	Emerald Street -	„ 11 -	3			3	240			216		8 houses to yard; street dirty; pails.
113	Moorgate Street -	„ 18 -	7				221, 244, 245, 246, 247, 248.					Well-paved street; house good condition.
114	Mellor Street -	„ 20 -	6			4				224		Separate yard; w.c,; fair state.
115	Hawthorne Street -	„ 20 -	6			2				225		High site; open; w.c.; good condition.
116	Woodgate Terrace -	„ 21 -	3			4				226		12 houses to yard; 2 w.c.'s; fair.
117	High Cross Street -	„ 21 -	10				227					Next door to 131. (House empty at visit.)
118	Cranbourne Street -	„ 24 -	3			3				228		Large gardens to house; w.c.; house clean.
119	Blake Street -	„ 24 -	2				229, 255					Yard to 4 houses; open ashpit; pails; moderate.
120	Leicester Street -	„ 25 -	3			2	230, 253			252, 261		Yard full of pools, &c.; house cleanly.
121	Beatrice Road -	„ 26 -	7				231					About 150 yards from Small-pox Hospital. Clean; good.
122	Gresham Street -	„ 27 -	5			1	272			232		As No. 82 (next door.)
123	Abbey Street -	„ 27 -	5			3				233		Old house; low rooms; dirty (next to 109).
124	Grosvenor Street -	„ 27 -	7			1				234		Butcher's; old house; pails; rooms clean.
125	Denmark Road -	„ 27 -	5				235					Not seen.
126	Wolsey Street -	„ 28 -	7			2				**236**		Yard to 2 houses; w.c.; open ashpit; 6 rooms.
127	Grundon Street -	„ 29 -	2			6				239, 264		Large yard to 4 houses; w.c. and open ashpit at each end; 4 rooms to house; fair.
128	Wright Street -	„ 30 -	7			2	241, 257, 263, 267, 268, 270.			262, 273		10 houses to one passage; garden; 6 rooms; fair.
129	Causeway Lane -	„ 31 -	5				242					2 houses to yard; pails; fair.
130	Burgram Street -	June 1 -	4				243					As No. 87.
131	High Cross Street -	„ 7 -	3			3	249					Baker's shop; cleanly and well kept.
132	Belgrave Gate -	„ 7 -	5			1	250					Butcher's shop; good; clean.
133	Rowan Street -	„ 8 -	1			3				251		Not seen.
134	East Bond Street -	„ 10 -	5			4				254		Greengrocery; new house; shop well kept.
135	Leicester Steeet -	„ 11 -	7			4	256			265		As No. 120.
136	Beatricc Road -	„ 12 -	2		2		259					Very clean; large yard; bakery at back.
137	Syston Street -	„ 12 -	5			1				260		5 rooms; clean; w.c.
138	New Road, Burley's Lane.	„ 13 -	3			1				266		Small old house; dirty; open ashpit; pails.
139	Beatrice Road -	„ 15 -	6				269					Not seen.
140	All Saints' Road -	„ 15 -	7			2	291			271, 289		Neglected; dirty; canal at back.
141	Beatrice Road -	„ 17 -	3			3				274, 282, **288.**		
142	„ „ -	„ 17 -	3				275					As No. 136, &c.
143	Ruby Street -	„ 18 -	3			2	276					
144	Norfolk Street -	„ 19 -	7	1			277					Small villa; 7 rooms; w.c.
145	Ivanhoe Street -	„ 19 -	9				278					6 rooms; well kept; ashpit; w.c. in yard.
146	„ „ -	„ 19 -	2			1				279		As 145.
147	„ „ -	„ 21 -	5				280					
148	Beatrico Road	„ 22 -	2			3				281		As 136, &c.
149	„ „ -	„ 23 -	2			4	345			283		
150	„ „ -	„ 23 -	3		1		284					

* The figures in theso columns refer to Table of Cases. Those in leaded type are fatal cases.

TABLE of HOUSES INVADED, with DETAILS as to VACCINATION of their INMATES—*continued.*

Ref. to House List.	Street.	Date of Infection.	Inmates.				Attacked with Small-Pox.				Persons quarantined at Hospital.	Sanitary Condition of House, &c.
			Vaccinated.	No Information as to Vaccination.	Under Vaccination.	Unvaccinated.	Vaccinated.	No Information as to Vaccination.	Under Vaccination.	Unvaccinated.		
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
151	Raven Street	1893. June 23	5				285					New house; clean.
152	Thornton Lane	„ 26	5				286					4 rooms; pails in yard, &c.
153	Queen Street	„ 28	9				287					Not seen.
154	Ruby Street	„ 30	3			2				290, 299		As No. 76.
155	Great Holme Street	July 2	3				292					Ill-kept; old house; 4 rooms; yard neglected; pails; open ash-pit.
156	Fosse Road	„ 4	3		7	1				293		Detached house (not visited).
157	Grove Road	„ 5	3			5				294		Small yard; 6 rooms, to house; fairly kept.
158	Leamington Street	„ 6	2				295					Yard to 2 houses; w.c.; open ash-pit; fair.
159	Brookhouse Street	„ 6	3		1	1				296		Large; well kept; w.c. in house.
160	Newington Street	„ 8	4				297					Separate yard; 6 rooms; clean; w.c.
161	Ivanhoe Street	„ 9	6				298					As 145.
162	Sylvan Street	„ 22	7			1	300					Good sanitary condition; recently built.
163	„ „	„ 22	3				301					Good sanitary condition; recently built.
164	Newport Street	„ 25	3			2	302			313		As No. 177.
165	Ruby Street	„ 25	5			1	303					As No. 76.
166	Beatrice Road	„ 25	4				304					Yard at back; open w.c.; 6 rooms and bath-room; well kept.
167	Great Holme Street	„ 26	4				305, 310					Builder's yard; clean; sanitary.
168	Beatrice Road	„ 27	6				306					Greengrocery; stabling; w.c.; good.
169	Hinckley Road	„ 28	8				307					Large 12-roomed house; good.
170	Tyndale Street	„ 31	2			1	308					New, and like No. 99.
171	Oban Street	Aug. 1	4			4				309		6 rooms; well kept.
172	Craven Street	„ 10	1			2	312			**311**		5 cottages in row; no back windows; pails; dustbin; unpaved yard.
173	Castle Street	„ 12	3				314					Not seen.
174	Ruby Street	„ 13	6			3				315, **316**		As No. 76.
175	Dorset Street	„ 21	2			3				317		Passage to 2 houses; yard to each; w.c.; ashpit; fairly kept.
176	Court N, Oxford Street.	„ 26	5			2	318, 326, 327.			324, 325		Not seen.
177	Newport Street	„ 30	3		1	1	319			328		Yard; small garden; w.c.; ashpit; new house; fair.
178	„ „	„ 31	4			1				320		Shop and dwelling; new house; fair.
179	North Bridge Place	Sept. 3	4			4				321		Yard to 5 houses (fowls); w.c.; 6 rooms; fair.
180	Dorset Street	„ 6	2			6	332			322, 329		Yard to 2 houses; fairly clean.
181	Diamond Street	„ 11	8			3	323					Neglected; yard dirty; pail system.
182	New Bridge Street	„ 20	3		1		330					Not seen.
183	Underhill Street	„ 21	3			1				331		6 rooms; w.c.; ashpit; fairly kept.
184	Vann Street	Oct. 5	7			2	333					Large garden to 8 houses; w.c.; clean.
185	Frog Island	„ 6	6			3	334			340, 342		New shop; large yard; pails; open ashpit.
186	Grange Lane	„ 9	5			1	335			338		Large drapery; not seen; sanitary arrangements reported good.
187	Gresham Street	„ 10	3			3	336, 344			341		Yard to 4 houses; long passage; fairly kept.
188	Cheapside	„ 14	20				337					Not seen.
189	Court D, Archdeacon Lane	„ 27	1			3				**339**		Five rooms; moderate; pails.
190	Catherine Street	Nov. 16	6				343					Not seen.
191	Southampton Street	„ 21	6			1	345					6 rooms; well kept; w.c.
192	Beatrice Road	„ 21	2			3				347, 353		As others in road.
193	Ruby Street	„ 22	5			4	351			**348, 352.**		As No. 98.
194	Clarendon Street	„ 27	7				349					Not seen.
195	Beatrice Road	„ 30	4			1	350			354		As others.
196	Ruby Street	Dec. 12	4			4				355		As No. 98.
197	Wand Street	„ 18	5		2	4				356		Well kept; good state.
198	Westbourne Street	„ 20	3			1				357		Six rooms; clean and well kept.
	193 households analysed		841	5	38	350	170	—	4	146		
							15					Cases in 4 other dwellings (including three lodging-houses).
							4			7		Cases arising at Fever Hospital and not removed.
							8	1		1		Cases arising at Workhouse.
							197 (198*)	1	4	154		* One case twice admitted, 60 (111).

* The figures in these columns refer to Table of Cases. Those in leaded type are fatal cases.

Note.—Of the 38 here stated to be "under vaccination," 21 were unvaccinated at time of removal of the case. As no further case of small-pox arose in their houses in the subsequent analyses these are included amongst the unvaccinated.

§14. *Analytical Study of the Incidence of Small-pox on the Members of 193 infected Households.*

From the particulars kindly furnished to me of all the persons who were removed to quarantine or were under supervision for 15 days after the occurrence of a case of small-pox in a house, I have extracted the details of 193 such infected households.*

The total number of persons dwelling in these houses is 1,234, of whom 320 were attacked with small-pox. The distribution of the cases of small-pox with reference to the size of the households may be gathered from the subjoined table:—

TABLE XXI.

Households.		Total Inmates.	Cases of Small-pox. Number per Household.								Total.
Size (No. of Inmates).	No. infected.		1.	2.	3.	4.	5.	6.	7.	8.	
2	5	10	4	1	—	—	—	—	—	—	6
3	18	54	15	3	—	—	—	—	—	—	21
4	23	92	19	3	—	1	—	—	—	—	29
5	34	170	21	7	3	2	1	—	—	—	57
6	29	174	17	7	4	1	—	—	—	--	47
7	24	168	13	4	4	—	2	1	—	—	49
8	23	184	14	4	4	—	1	—	—	—	39
9	19	171	11	2	4	—	1	—	—	1	40
10	8	80	5	1	—	1	1	—	—	—	16
11	6	66	5	1	—	—	—	—	—	—	7
13	2	26	1	—	—	—	—	1	—	--	7
19	1	19	1	—	—	—	—	—	—	—	1
20	1	20	1	—	—	—	—	—	—	—	1
—	193	1,234	127	33	19	5	6	2	—	1	320

Sex and Age.—Of these 1,234 individuals, 573 were males and 661 females, whilst of the 320 who were attacked with small-pox, 153 were males and 167 females. The rate of incidence was therefore 26·5 per cent. for the male sex and 25·2 per cent. for the female sex.

The age distribution was as follows:—

TABLE XXII.

—	Attacked with Small-pox.	Not attacked.	Total.
Under 1 year	7	26	33
1 to 5 years	31	95	126
5 „ 10 „	64	138	202
10 „ 15 „	36	135	171
15 „ 20 „	33	114	147
20 „ 30 „	82	134	216
30 „ 40 „	41	94	135
40 „ 50 „	19	107	126
50 „ 60 „	6	44	50
60 „ 70 „	1	14	15
70 and over	—	4	4
Age not ascertained	—	9	9
	320	914	1,234

These may be distributed between age-periods as follows:—

—	Attacked.	Not attacked.	Total.	Attack Rate.
				Per Cent.
Under 1 year	7	26	33	21·2
1 to 10 years	95	233	328	28·9
10 „ 30 „	151	383	534	28·2
30 years and upwards	67	263	330	20·3
Age not ascertained	—	9	9	—
	320	914	1,234	25·9

From Table XXI. it will have been seen that in 127 households, comprising 795 individuals, there was only a single case of small-pox; whilst in 66 households, comprising 439 individuals, more than one case occurred (or 193 in all).

Contrasting these two categories in respect to the ages of the inmates we have:—

Ages of Inmates.	Houses with Single Cases.	Houses with Multiple Cases.
Under 1 year	19 or 2·3 per cent.	14 or 3·2 per cent.
1 to 10 years	196 „ 24·6 „	132 „ 30· „
10 „ 30 „	358 „ 45·0 „	176 „ 40·1 „
30 years and upwards	213 „ 26·5 „	117 „ 26·6 „
Age not ascertained	9 „ 1·2 „	— —
	795	439

These figures show a slight preponderance in the relative number of children in those households in which more than one case of small-pox occurred, as contrasted with those in which only a single case arose.

The difference is still more striking when only those who were attacked are considered.

—	Single.	Multiple.
Under 1 year	2 or 1·5 per cent.	5 or 2·5 per cent.
1 to 10 years	23 „ 18·1 „	72 „ 37·3 „
10 to 30 „	71 „ 55·9 „	80 „ 41·4 „
30 years and upwards	31 „ 24·4 „	36 „ 18·6 „
	127	193

It is instructive to note, with reference to the more ready transmission of the disease amongst the young, that a similar preponderance of children attacked with small-pox is to be found in the "multiple series" amongst those who were the first in the household to fall ill. These cases, hereafter termed the "initial" cases, number 80 out of the 193 attacked in those 66 households, and are distributed in age-periods as follows:—

Under 1 year	2 or 2·5 per cent.	
1 to 10 years	25 „ 31·2	„
10 to 30 years	42 „ 52·5	„
30 years upwards	11 „ 13·7	„

If any conclusion is permissible from figures so restricted as those it would be that the liability to further infection of a household on the occurrence of small-pox in one of its members, is greater in proportion to the youth of the subject first to be attacked.

Comparison of those attacked and not attacked as regards Vaccination.

Before proceeding to analyse the facts relating to these households more precisely, it may be well to give here their condition *quâ* vaccination, distinguishing those who were attacked with small-pox and those who escaped infection. The statistics will be found in Tables XXIII. and XXIV., which deal with those houses which yielded single and multiple cases respectively. It will be seen that amongst the unvaccinated, a certain proportion were vaccinated as soon as the case was isolated, *i.e.*, after they had been exposed to chances of infection; and where more than one case occurred 4 out of 17 so vaccinated (and who were therefore under vaccination at the time of exposure or of attack) were attacked by the disease.

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* I have limited this analysis to the persons dwelling in the houses, but it should be stated that sometimes it was found necessary to quarantine others known to have been in contact with the patient but dwelling apart from him.

Table XXIII.

Single Cases in Houses (127).

—	Attacked.		Not Attacked.				Total.				
					Unvaccinated.				Unvaccinated.		
	Vaccinated.	Unvaccinated.	Vaccinated.	No information.	Vaccinated on removal of Case.	Remained.	Vaccinated.	No information.	Vaccinated on removal of Case.	Remained.	
Under 1 year	—	2	1	—	—	16	1	—	—	18	19
1–5	—	4	12	—	7	49	12	—	7	53	72
5–10	—	19	50	—	10	45	50	—	10	64	124
10–15	5	8	72	—	2	16	77	—	2	24	103
15–20	10	4	74	—	2	7	84	—	2	11	97
20–30	37	7	112	—	—	2	149	—	—	9	158
30–40	19	—	54	—	—	4	73	—	—	4	77
40–50	7	2	68	4	—	2	75	4	—	4	83
50–60	3	—	37	1	—	—	40	1	—	—	41
60–70	—	—	10	—	—	—	10	—	—	—	10
70 and over	—	—	2	—	—	—	2	—	—	—	2
Age?	—	—	9	—	—	—	9	—	—	—	9
	81	46	501	5	21	141	582	5	21	187	795

Table XXIV.

Multiple Cases in Houses (66).

—	Attacked.			Not Attacked.			Total.			
	Vaccinated.	Under Vaccination.	Unvaccinated.	Vaccinated.	Under Vaccination.	Unvaccinated.	Vaccinated.	Under Vaccination.	Unvaccinated.	
Under 1 year	—	1	4	—	1	8	—	2	12	14
1–5	—	1	26	—	2	25	—	3	51	54
5–10	2	1	42	13	4	16	15	5	58	78
10–15	4	—	19	31	4	10	35	4	29	68
15–20	14	1	4	25	2	4	39	3	8	50
20–30	34	—	4	20	—	—	54	—	4	58
30–40	21	—	1	36	—	—	57	—	1	58
40–50	10	—	—	33	—	—	43	—	—	43
50–60	3	—	—	76	—	—	9	—	—	9
60–70	1	—	—	4	—	—	5	—	—	5
70 and over	—	—	—	2	—	—	2	—	—	2
	89	4	100	170	13	63	259	17	163	439
Total in all Houses	170	4	146	671	5	34 204	841	5	38 350	1,234

Influence of Isolation in Limiting Household Infection:—Leaving aside the question of age, the next point of comparison between these two series of infected households to be considered may be to ascertain whether or not the more or less prompt removal to hospital bore any relation to the occurrence of cases after the initial ones had been removed.

Single Cases in Households.

There were 127 houses in which only one case occurred, having a total population of 795, the attack-rate being 16 per cent.

Seven of these cases were treated at their own homes, which contained in all 41 persons, the attack-rate being 17 per cent.

Of the remainder, 120, all of whom were removed to hospital (a case of re-infection was twice admitted, but is not counted twice in this list), came from houses having 754 inmates, the attack-rate being 15·9 per cent.

Single Cases in Households.

A.—List of Households in which one case of Small-pox occurred and was removed to Hospital.

Reference to House List.	Number of Inmates.	Reference to Case List.	Attacked with Small-Pox.			Remarks.
			Date of Rash.	Date of Removal.	Day of Attack and when Removed.	
2	2	2	Sept. 8	Sept. 9	6th.	
5	3	8	Oct. 17	Oct. 21	10th.	
6	5	9	„ 19	„ 20	4th.	
9	3	17	Nov. 4	Nov. 4	3rd.	
10	4	18	„ 5	„ 5	3rd.	
11	5	20	„ 5	„ 9	7th.	
13	11	24	„ 16	„ 18	5th.	
15	3	27	„ 23	„ 24	6th.	
16	8	28	„ 25	„ 26	4th.	
18	10	30	Dec. 4	Dec. 6	5th.	
25	4	42	„ 26	„ 28	5th.	
27	9	46	Jan. 2	Jan. 3	4th.	
30	10	50	„ 5	„ 7	6th.	
31	6	54	„ 6	„ 8	6th.	
34	8	57	„ 6	„ 8	5th.	
35	8	58	„ 6	„ 13	10th.	
36	6	{60 111	„ 7 „ 30	„ 8 „ 30	4th. 3rd.	
38	8	69	„ 11	„ 13	7th.	
39	4	70	„ 9	„ 10	3rd.	
40	5	71	„ 10	„ 11	4th.	
42	7	73	„ 10	„ 12	4th.	
43	11	74	„ 12	„ 15	7th.	
45	6	76	„ 11	„ 13	5th.	
48	3	83	„ 18	„ 22	7th.	
49	9	86	„ 19	„ 23	7th.	
52	9	97	„ 21	„ 21	2nd.	
53	7	100	„ 24	„ 25	4th.	
54	7	102	„ 24	„ 25	4th.	
55	5	103	„ 24	„ 25	4th.	
56	2	105	„ 25	„ 26	4th.	
57	5	107	„ 28	„ 28	3rd.	
58	6	108	„ 29	Feb. 1	6th.	
60	19	113	Feb. 1	„ 1	4th.	
61	2	115	„ 2	„ 4	5th.	
62	3	116	„ 2	„ 4	5th.	
63	5	120	„ 6	„ 8	6th.	
64	6	117	„ 2	„ 4	5th.	
66	6	127	„ 13	„ 17	7th.	
72	6	138	March 3	March 6	6th.	
75	10	150	„ 23	„ 23	3rd.	
76	5	157	„ 29	April 3	8th.	
78	7	159	„ 30	„ 1	5th.	
79	4	160	„ 31	March 31	3rd.	
80	3	162	April 4	May 9	38th.	
88	4	176	„ 13	April 14	4th.	
89	6	178	„ 15	„ 16	4th.	
91	9	181	„ 18	„ 19	4th.	
92	3	184	„ 19	„ 21	5th.	
93	5	188	„ 26	„ 28	6th.	
96	4	195	„ 29	May 1	5th.	
99	13	201	May 4	„ 6	5th.	
100	3	202	„ 5	„ 6	4th.	
101	5	203	„ 7	„ 10	6th.	

A.—List of Households, &c.—*continued.*

Reference to House List.	Number of Inmates.	Reference to Case List.	Attacked with Small-Pox.			Remarks.
			Date of Rash.	Date of Removal.	Day of Attack and when Removed.	
102	7	205	May 10 -	May 16 -	9th.	
103	3	206	„ 10 -	„ 15 -	8th.	
105	7	208	„ 12 -	„ 15 -	8th.	
106	5	210	„ 12 -	„ 15 -	6th.	
107	4	211	„ 12 -	„ 13 -	4th.	
108	7	212	„ 13 -	„ 17 -	7th.	
110	7	214	„ 13 -	„ 17 -	7th.	
111	9	215	„ 13 -	„ 15 -	5th.	
114	10	224	„ 22 -	„ 23 -	4th.	
115	8	225	„ 22 -	„ 26 -	7th.	
116	7	226	„ 23 -	„ 29 -	9th.	
117	10	227	„ 23 -	„ 29 -	9th.	
118	6	228	„ 26 -	„ 31 -	8th.	
121	7	231	„ 28 -	June 1 -	7th.	
123	8	233	„ 29 -	„ 2 -	7th.	
124	8	234	„ 29 -	May 31 -	5th.	
125	5	235	„ 29 -	June 2 -	7th.	
126	9	236	„ 30 -	May 31 -	4th.	
129	5	242	June 2 -	June 3 -	4th.	
130	4	243	„ 3 -	„ 6 -	6th.	
131	6	249	„ 9 -	„ 11 -	5th.	
132	6	250	„ 9 -	„ 11 -	5th.	
133	4	251	„ 10 -	„ 12 -	5th.	
134	9	254	„ 12 -	„ 14 -	5th.	
136	4	259	„ 14 -	„ 16 -	5th.	
137	6	260	„ 14 -	„ 15 -	4th.	
138	4	266	„ 15 -	„ 17 -	5th.	
139	6	269	„ 17 -	„ 20 -	6th.	
142	3	275	„ 20 -	„ 20 -	3rd.	
143	5	276	„ 20 -	„ 21 -	4th.	
144	8	277	„ 21 -	„ 25 -	7th.	
145	9	278	„ 21 -	„ 23 -	5th.	
146	3	279	„ 21 -	„ 23 -	5th.	
147	5	280	„ 23 -	„ 25 -	5th.	
148	5	281	„ 24 -	„ 25 -	4th.	
150	4	284	„ 25 -	„ 27 -	5th.	
151	5	285	„ 26 -	„ 30 -	8th.	
152	5	286	„ 28 -	July 1 -	6th.	
153	9	287	„ 30 -	„ 31 -	34th.	
155	3	292	July 4 -	„ 9 -	8th.	
156	11	293	„ 6 -	July 9 -	6th.	
157	8	294	„ 7 -	„ 11 -	7th.	
158	2	295	„ 8 -	„ 10 -	5th.	
160	4	297	„ 10 -	„ 11 -	4th.	
161	6	298	„ 11 -	„ 12 -	4th.	
162	8	300	„ 24 -	„ 26 -	5th.	
163	3	301	„ 24 -	„ 27 -	6th.	
165	6	303	„ 27 -	Aug. 4 -	11th.	
166	4	304	„ 27 -	July 29 -	5th.	
168	6	306	„ 29 -	„ 30 -	4th.	
170	3	308	Aug. 2 -	Aug. 9 -	10th.	
171	8	309	„ 3 -	„ 4 -	4th.	
175	5	317	„ 23 -	„ 24 -	4th.	
178	5	320	Sept. 2 -	Sept. 3 -	4th.	
179	8	321	„ 5 -	„ 6 -	4th.	
181	11	323	„ 13 -	„ 14 -	4th.	

A.—List of Households, &c.—*continued.*

Reference to House List.	Number of Inmates.	Reference to Case List.	Attacked with Small-pox.			Remarks.
			Date of Rash.	Date of Renewal.	Day of Attack and when Removed.	
182	4	330	Sept. 22 -	Sept. 24 -	5th.	
183	4	331	„ 23 -	„ 26 -	6th.	
184	9	333	Oct. 7	Oct. 9 -	5th.	
188	20	337	„ 16 -	„ 18 -	5th.	
189	4	339	„ 29 -	„ 30 -	4th.	
190	6	343	Nov. 18 -	Nov. 21 -	6th.	
191	7	346	„ 23 -	„ 24 -	4th.	
194	7	349	„ 29 -	„ 30 -	4th.	
196	8	355	Dec. 14 -	Dec. 16 -	4th.	
197	11	356	„ 20 -	„ 26 -	9th.	
198	4	357	„ 22 -	„ 24 -	5th.	

B.—Households in which the Case of Small-pox Remained at Home.

Reference to House List.	Number of Inmates.	Reference to Case List.	Attacked with Small-pox.			Remarks.
			Date of Onset.	Date of Rash.	Day of Attack and when Removed.	
37	7	63	Jan. 5 -	?		
44	9	75	„ 9 -	?		
46	5	79	„ 12 -	?		
51	4	95	„ 19 -	?		
159	5	296	July 6 -	?		
169	8	307	„ 28 -	July 30.		
173	3	314	Aug. -			

Multiple Cases in Households.

More than one case of small-pox occurred in 66 of the households under review, which contained a population of 439 individuals, of whom 193 were attacked with the disease, a rate of nearly 44 per cent.

In considering these cases it is important to distinguish between those who were first to be attacked and those who sickened subsequently. The former are here styled "initial" cases, the rest being termed "later cases." Occasionally it happened that two or more of the inmates fell ill within a few days of one another, being probably infected from the same source, and in that case they would all be regarded as "initial" cases, to which, perhaps, no later ones succeeded. In that case the households concerned would really fall into the same category as those in which only one case occurred, and in dealing with them statistically it will be necessary to transfer them to that category. I have therefore only placed in the category of "later" cases, who may possibly have received infection from the "initial" ones in the same house, those whose illness began on the 12th, or subsequent days of the onset of the initial case. I do not intend to imply that in every case the infection was traceable to the previous one, for this is beyond proof. It is highly probable that this was so in the majority of instances.

Thus, of the 193 cases, 80 may be regarded as being "initial," and 113 as belonging to the group of "later" (and possibly secondary) cases.

As showing the influence of hospital isolation in limiting the spread of the disease in a family, these multiple cases may be divided into two groups, viz.:—

Series A. in which the initial case was removed to hospital, and

Series B., in which the initial cases remained at home.

Series A. comprises 51 households, containing 338 members, of whom 140 were attacked with small-pox; 64 of these may be regarded as "initial" cases, or 19·8 per cent. of all exposed. Subtracting them we have 274 persons, of whom 76, or 27·7 per cent., were subsequently attacked.

Series B. includes 15 households, containing 101 members, of whom 53 were attacked with small-pox; 16 of these may be regarded as "initial" cases, or 15·8 per cent. of the whole number. Subtracting them we have 85 persons, of whom 37, or 43·5 per cent., were subsequently attacked.

According to this the influence of hospital isolation in limiting the spread of the disease in families may be represented as the difference between 27·7 per cent. and 43·5 per cent. of those remaining after the first invasion of the disease in the household.

This, however, requires correction, since in six of these households (Nos. 73, 85, 104, 135, 172, 174) in Series A., the cases were probably infected from a same source, and it cannot be said that any was secondary to a previous case in the house. By eliminating these households comprising 27 individuals, of whom 14 were attacked, the numbers in Series A. were reduced to 45 households, 291 inmates, 50 being attacked in the first instance, and of the 241 remaining 76, or 31·1 per cent., subsequently sickened.

The influence of hospital isolation may then be more correctly stated as between 31·1 per cent. and 43 per cent.

MULTIPLE CASES IN HOUSEHOLDS.

SERIES A.—INITIAL CASES REMOVED TO HOSPITAL.

Ref. to House List.	Number of Inmates.	Initial Cases.				Later Cases.				Remarks.
		Ref. to Case List.	Date of Onset.	Date of Rash.	Day of Removal.	Ref. to Case List.	Date of Onset.	Day of Attack of Initial Case.	Date of Removal.	
3	3	3	Sept. 5	Sept. 7	6th	5	Sept. 27	23rd		
4	6	6	Sept. 28	Oct. 3	6th	7	Oct. 13	16th	Oct. 19	
12	7	23	Nov. 13	Nov. 16	7th	32	Dec. 7	26th	Dec. 10	
14	8	26	Nov. 18	Nov. 21	6th	31	Dec. 4	17th	Dec. 6	
17	7	29	Nov. 29	Dec. 1	5th	36	Dec. 12	14th	Dec. 17	
28	4	47	Dec. 31	Jan. 3	6th	84	Jan. 17	18th	Jan. 19	
29	6	49	Jan. 1	Jan. 5	8th	81	Jan. 15	15th	Jan. 18	
33	4	56	Jan. 4	Jan. 6	4th	89	Jan. 18	15th	Jan. 20	
59	5	110	Jan. 28	Jan. 31	7th	130	Feb. 16	20th	Feb. 18	
65	7	121	Feb. 4	Feb. 7	8th	131	Feb. 16	13th	Feb. 18	
67	7	129	Feb. 12	Feb. 14	5th	136	Feb. 27	16th	March 2	
68	3	133	Feb. 18	Feb. 21	6th	143	March 7	18th	March 10	
70	5	135	Feb. 25	Feb. 27	3rd	155	March 26	20th	March 29	
73	10	139 140	March 2 „ 3	March 6 „ 6	5th 4th					
81	6	163	April 3	April 5	7th	185	April 19	17th	April 22	
98	9	199	April 30	May 2	4th	220	May 17	18th	May 20	
109	8	213	May 11	May 13	6th	238	May 29	19th	June 2	
112	6	216	May 11	May 13	6th	240	May 30	20th	June 2	
122	6	232	May 27	May 29	5th	272	June 16	21st	June 19	
127	8	239	May 29	May 31	4th	264	June 13	16th	June 17	
135	11	256 265	June 11 „ 13	June 13 „ 15	3rd 4th					
149	6	283	June 23	June 25	5th	345	Nov. 20	—	Nov. 23	No doubt fresh infection
154	5	290	June 30	July 2	40th	299	July 14	15th	Aug. 8	
164	5	302	July 25	July 27	9th	313	Aug. 12	19th	Aug. 15	
167	4	305	July 26	July 28	6th	310	Aug. 9	15th	Aug. 13	
172	3	311 312	Aug. 10 „ 10	Aug. 12 „ 12	5th 5th					
174	9	315 316	Aug. 13 „ 16	Aug. 15 „ 18	5th 4th					
177	5	319	Aug. 30	Sept. 1	7th	328	Sept. 18	20th	Sept. 21	
192	5	347	Nov. 21	Nov. 23	4th	353	Dec. 6	16th	Dec. 8	

Series A.—Initial Cases removed to Hospital—*continued.*

Ref. to House List.	Number of Inmates.	Later Cases.				Initial Cases.				Remarks.
		Ref. to Case List.	Date of Onset.	Date of Rash.	Day of Removal.	Ref. to Case List.	Date of Onset.	Day of Attack of Initial Case.	Date of Removal.	
195	5	350	Nov. 30	Dec. 2	4th	354	Dec. 12	13th	Dec. 14	
19	6	33	Dec. 10	Dec. 16	12th	44	Dec. 31	22nd	Jan. 2	
						59	Jan. 4	26th	„ 6	
41	7	72	Jan. 9	Jan. 11	23rd	104	Jan. 23	15th	Jan. 28	
						126	Feb. 9	32nd	Feb. 11	
50	8	88	Jan. 17	Jan. 19	8th	119	Feb. 2	15th	Feb. 4	
						124	„ 4	17th	„ 6	
77	8	158	March 27	March 29	22nd	165	April 8	13th	April 12	
						177	„ 12	17th	„ 15	
85	5	167	April 7	April 9	7th					
		169	„ 10	„ 12	4th					
		170	„ 10	„ 12	6th					
90	7	180	April 14	April 16	6th	194	April 26	13th	April 29	
						198	„ 30	17th	May 2	
94	8	191	April 25	April 27	3rd	209	May 10	16th	May 12	
						218	„ 13	19th	„ 15	
97	7	196	April 28	May 1	12th	222	May 19	22nd	May 22	
						223	„ 19	22nd	„ 22	
104	9	207	May 8	May 10	4th					
		217	„ 13	„ 16	4th					
		219	„ 17	„ 20	4th					
140	9	271	June 15	June 17	5th	289	June 29	15th	July 2	
						291	July 2	18th	„ 4	
141	6	274	June 17	June 19	4th	282	June 22	16th	June 24	
						288	„ 29	23rd	July 2	
180	8	322	Sept. 6	Sept. 8	6th	329	Sept. 20	15th	Sept. 22	
						332	„ 21	16th	„ 24	
23	5	40	Dec. 20	Dec. 22	5th	51	Jan. 3	15th	Jan. 5	
						52	„ 3	15th	„ 8	
						92	„ 19	31st	„ 22	
86	6	171	April 10	April 12	7th	189	April 23	14th	April 27	
		172	„ 10	„ 12	7th	193	„ 26	17th	May 2	
120	5	230	May 25	May 27	7th	252	June 8	15th	June 12	
						253	„ 9	16th	„ 12	
						261	„ 12	19th	„ 14	
26	9	45	Dec. 31	Jan. 2	13th	82	Jan. 16	17th	Jan. 18	
		64	Jan. 6	„ 9	7th	85	„ 17	18th	„ 20	
						87	„ 17	18th	„ 19	
32	8	55	Jan. 3	Jan. 5	21st	90	Jan. 18	16th	Jan. 23	
						91	„ 18	16th	„ 23	
						93	„ 19	17th	„ 23	
						101	„ 22	20th	„ 24	
83	7	165	April 4	?	—	190	April 24	21st	April 28	
		173	„ 10	April 12	5th					
		174	„ 10	„ 12	5th					
		179	„ 14	„ 16	4th					

SERIES A.—INITIAL CASES REMOVED TO HOSPITAL—*continued.*

Ref. to House List.	Number of Inmates.	Initial Cases.				Later Cases.				Remarks.
		Ref. to Case List.	Date of Onset.	Date of Rash.	Day of Removal.	Ref. to Case List.	Date of Onset.	Day of Attack of Initial Case.	Date of Removal.	
176	7	318	Aug. 26	Aug. 28	8th	324	Sept. 11	17th	Sept. 14	
						325	„ 11	17th	„ 13	
						326	„ 11	17th	„ 13	
						327	„ 12	18th	„ 14	
20	13	34	Dec. 11	Dec. 13	7th	77	Jan. 10	31st	—	
						114	„ 30	51st	Feb. 4	
						122	Feb. 4	56th	„ 7	
						123	„ 4	56th	„ 7	
						128	„ 12	54th	„ 16	
113	7	221	May 18	May 20	9th	244	June 1	15th	June 6	
						245	„ 2	16th	—	
						246	„ 4	18th	June 6	
						247	„ 4	18th	„ 9	
						248	„ 4	18th	—	

MULTIPLE CASES IN HOUSEHOLDS.

SERIES B.—INITIAL CASES REMAINED AT HOME.

Reference to House List.	Number of Inmates.	Initial Cases.			Later Cases.				Remarks.
		Reference to Case List.	Date of Onset.	Date of Rash.	Reference to Case List.	Date of Onset.	Day of Attack of Initial Case.	Date of Removal to Hospital.	
119	2	229	May 24	?	255	June 10	18th	June 17	
186	6	335	Oct. 9	Oct. 11	338	Oct. 20	12th	Nov. 3	
22	7	39	Dec. 15	Dec. 15	43	Dec. 30	16th	Jan. 2	
					48	Jan. 1	18th	„ 5	
74	6	149	March 19	?	161	April 2	15th	—	Nos. 149 and 156 were not notified.
		156	„ 26						
82	5	164	April 3	April 3	183	April 17	15th	April 20	
					197	„ 29	27th	May 2	
87	5	175	April 10	?	237	May 28	49th	June 1	No. 175 was not notified.
					258	June 11	63rd	„ 13	
185	9	334	Oct. 6	Oct. 8	340	Oct. 28	23rd	Nov. 1	
					342	Nov. 13	39th	„ 16	
187	6	336	Oct. 10	Oct. 12	341	Nov. 2	24th	Nov. 6	
					344	„ 20	42nd	„ 23	
193	9	348	Nov. 22	Nov. 24	351	Dec. 3	12th	Dec. 5	
					352	„ 3	12th	„ 5	
84	10	166	April 5	April 7	182	April 16	12th	April 22	
					186	„ 19	15th	„ 24	
					187	„ 20	16th	„ 22	
21	1	38	Dec. 15	Dec. 17	53	Jan. 3	20th	Jan. 11	
					61	„ 5	22nd	„ 10	
					67	„ 7	24th	„ 11	
					94	„ 19	36th	„ 21	
69	5	134	Feb. 21	Feb. 23	147	March 11	19th	—	These cases were not notified.
					148	„ 13	21st		
					152	„ 22	30th		
					153	„ 22	30th		

Series B.—Initial Cases remained at Home—*continued.*

Reference to House List.	Number of Inmates.	Initial Cases.			Later Cases.				Remarks.
		Reference to Case List.	Date of Onset.	Date of Rash.	Reference to Case List.	Date of Onset.	Day of Attack of Initial Case.	Date of Removal to Hospital.	
95	8	192	April 25 -	?	204	May 6 -	12th	June 3 -	No. 192 not notified.
24	4	41	Dec. 23 -	?	65	Jan. 6 -	15th	Jan. 25 -	No. 41 convalescent from a mild and unrecognised attack of small-pox, was removed to hospital with her children on Jan. 25.
					96	„ 20 -	29th	„ 25 -	
					98	„ 20 -	29th	„ 25 -	
128	9	241	May 30 -	?	257	June 11 -	13th	June 15 -	No. 241 not notified.
					262	„ 13 -	15th	„ 16 -	
					263	„ 13 -	15th	„ 19 -	
					267	„ 14 -	16th	„ 19 -	
					268	„ 14 -	16th	„ 19 -	
					270	„ 15 -	17th	„ 19 -	
					273	„ 17 -	19th	„ 19 -	

Table showing the Day of Attack upon which Small-pox were removed to Hospital.

—	Group I.	Group II.	
	No. of Cases.	(Initial Cases.) No. of Cases.	Later Cases.
Removed on 2nd day -	1	—	—
„ 3rd „ -	8	2	28
„ 4th „ -	40	7	24
„ 5th „ -	36	8	8
„ 6th „ -	18	10	9
„ 7th „ -	15	9	2
„ 8th „ -	6	4	—
„ 9th „ -	4	2	—
„ 10th „ -	3	—	—
„ 11th „ -	1	—	—
„ 12th „ -	—	2	—
„ 13th „ -	—	1	—
„ 21st „ -	—	1	—
„ 22nd „ -	—	1	—
„ 23rd „ -	—	1	—
„ 26th „ -	1	—	1
„ 34th „ -			
„ 38th „ -	1	1	—
„ 40th „ -			
	134	49*	72†

* One of the initial cases in Group II., Series A., was not removed to hospital (No. 165). Three other inmates of the house sickened within six to ten days of the onset of this patient's illness, and are here returned as being also "initial" cases; they were removed to hospital.

† Four cases not removed, Nos. 3, 77, 245, 248.

The reason for the late removal of cases—practically convalescent—lies in the fact that attention was generally not drawn to them until the occurrence of subsequent cases, as the following will show:—

Group I., No. 287.—S. M., f., æt. 47., admitted on July 31st, the 34th day of her illness, which was unaccompanied by any marked constitutional disturbance; but two days after its commencement she was attacked by a profuse eruption, which was still well marked when admitted. There was no history of contact with a previous case; and the course and character of the rash was so anomalous that it was very doubtfully regarded as variolous. She was not put into the small-pox ward. She was said to have been re-vaccinated in 1871.

No. 162.—J. H., m., æt. 39, admitted on May 9th, the 38th day of his illness, presenting characteristic scabs of variola pustules. He had not been attended by a medical man; but a fortnight after he was taken ill his child sickened, and died on April 23rd, the cause of death being certified as "convulsions."

Group II., No. 33.—W. G. S., æt. 13, unvaccinated, a confluent attack, but not seen by medical officer until maturation was setting in. He at once removed the child to hospital, the 12th day of his illness. Two other cases arose in this house, viz., No. 44, who sickened on the 22nd day of the invasion in the first case, and was therefore probably infected about four days before No. 33's removal, and No. 59 who sickened four days later, and who may have been infected the same day that No. 33 was removed.

No. 196, B. S., f., æt. 2, unvaccinated, admitted May 9th, the 12th day of illness, having contracted the disease apparently from her father, who lives at T——, a village near Leicester. The child when taken ill was sent to its grandmother's in Leicester, where the case was discovered. Two other children subsequently sickened, Nos. 222 and 223, both on the 22nd day of the illness of No. 196, and were therefore probably infected four days before her removal to hospital.

No. 45, N. H., f., æt. 12, unvaccinated, had a very mild attack, the eruption fading when she was admitted on the 13th day of her illness. Six days after her illness began, her sister, F. H., æt. 14 (No. 64), sickened, and was taken into hospital the same day as No. 45, viz., January 12th, her attack being a severe and unmistakeable one. Three other children of this family subsequently sickened (viz., Nos. 82, 85, 87), three and four days after the removal of No. 45, by whom they had probably been infected about the 4th or 5th day of her illness.

No. 55, F. J., m., æt. 10, unvaccinated, had a discrete attack, which passed unrecognised until other cases arose in the house. He was admitted on the 21st day of attack, the four others (90, 91, 93, and 101) all falling ill within this period of his illness.

No. 158, H. B., f., æt. 21, vaccinated, was another case which had passed unrecognised, and was not discovered until inquiries were being made about a series of persons who had also mostly had mild unrecognised attacks. No. 158 had recovered from the eruption which had been sparsely distributed over the face and arms, when admitted on the 22nd day.

No. 72, J. J. J., m., æt. 8, unvaccinated, was taken into quarantine when his sister C. J. (No. 104) was admitted into the small-pox ward. It then became evident from the stains and marks on his limbs and face that he had recently passed through an attack himself, and was probably the source of the infection of No. 104 and No. 126.

No. 290, E. C., f., æt. 8 months, unvaccinated, passed through a severe attack without having any medical attendance, and about 14 days after she was attacked her brother, W. A. C., æt. 3, unvaccinated (No. 299), also sickened and had a confluent attack. Although neither was admitted until late in the disease, No. 299 on the 26th day, and No. 290 on the 40th day (both showing marked pitting and traces of eruption), no other members of the household suffered. They were only three in number, aged 5, 30, and 34 years respectively, and were all vaccinated.

To the foregoing 10 cases of unavoidable delay in admission to hospital may be added the following cases of mild small-pox which were not under medical treatment, and were detected by the sanitary authority.

In Group I., No. 303 was discovered in a house-to-house inspection of the district, a week after the rash appeared. She was removed to hospital on the 11th day.

No. 58 was also first seen after the rash had been out for a week, and was removed on the 10th day.

No. 227 admitted on 9th day.

No. 205 admitted on 9th day.

No. 292 discovered at home, not having medical advice; was admitted on the 8th day.

In Group II., No. 221, a dressmaker, who may have been infected through a visit of a nurse at the small-pox hospital, was admitted on the 9th day, and five other members of the family infected during the first days of her illness, also had sparse eruptions.

Deducting these 16 cases there remain for comparison in Group I., 127 cases; in Group II., 41 initial and 71 later cases.

In Group I., 85, or 67 per cent., were removed on the 5th day or earlier.

In Group I., 42, or 33 per cent., were removed on the 6th to 10th day.

In Group II., initial cases, 17, or 41·4 per cent., on 5th day or earlier.

In Group II., initial cases, 24, or 58·5 per cent., 6th to 9th day.

In Group II., later cases, 60, or 84·5 per cent., on 5th day or earlier.

In Group II., later cases, 11, or 15·5 per cent., on 6th and 7th days.

This computation clearly shows, as might have been anticipated, that promptitude in hospital isolation is a potent safeguard to the remaining members of a family. For Group I. is composed of households in which no cases were traceable to infection from the first to be attacked; while two-thirds of the cases were removed by the 5th day of attack; whereas in Group II., households in which cases arose subsequent to and probably infected by the first cases, only two-fifths of these initial cases were removed by the 5th day. It also shows how large a proportion can be removed in these early days when the invaded households are under observation, more than four-fifths of the later cases in this group being thus early isolated.

Quarantine of Members of Infected Households.

Dealing with the 193 households which have been here analysed, it is found that from 45 of them, containing in all 314 individuals, there were sent into quarantine at the hospital when the case (or cases) of small-pox was removed—211 of the unaffected inmates together with 24 other persons known to have been in contact with the patient. Of this number (211) 15 or 7·1 per cent. were attacked during the period of quarantine, whilst 4 others or 1·9 per cent. developed small-pox from 6 to 12 days after returning to their homes, the inference being that they must have been infected whilst in quarantine.

The system of quarantining was in operation from the beginning of the outbreak until May.

	Total of Invaded Houses.	Houses whence Inmates sent to Quarantine.	Households from which Members sent to Quarantine.						Total Number in Households sent to Quarantine.	Total Inmates of all Invaded Houses.
			Initial Cases of Small-pox.	Sent to Quarantine.	Later Cases of Small-pox.			Remained at Home.		
					Arising before Quarantine.	During Quarantine.	After Quarantine.			
September 1892 -	3	3	3	8	—	1	1	—	11	11
October „ -	2	2	2	6	—	—	—	—	8	8
November „ -	9	7	7	38	—	1	1	—	45	56
December „ -	11	6	7	29	2	7	1	5	43	81
January 1893 -	34	14	14	78	5	4	—	6	103	225
February „ -	7	4	4	19	—	1	1	—	23	38
March „ -	8	1	1	5	2	—	—	2	10	56
April „ -	19	4	9	9	1	1	—	3	22	117
May „ -	31	4	4	19	1	—	—	6	30	213
	124	45	51	11	11	15	4	22	295	805

It is apparent from these figures that the system of removal to quarantine of those dwelling in infected houses was only partially carried out during the months it was in operation. The alternative method, that, namely, of keeping infected households and persons known to have been exposed to infection under supervision by the sanitary officials for the quarantine period, was carried out in the remainder, and in all those which occurred after the month of May. It is impossible to secure data which would enable me to judge of the comparative efficiency of these two systems. In theory, the isolation of an infected family for 15 days should prevent the spread of the disease beyond its limits: and it might be thought that this isolation was far more certainly secured by removal of the family to a special quarantine building. On the other hand, when, as was the case at Leicester, the quarantine building is contiguous to that used for the reception of those attacked with the disease, there must be some risk of infection of those quarantined, or of their transference of contagion to others on leaving quarantine. These considerations, besides the fact that both plans were in operation together, make it very difficult to institute a comparison between them.

	Houses: Number Invaded.	Number of Inmates.	Attacked with Small-pox.		Sent to Quarantine.	Remained at Home.
			Initial Cases.	Later Cases.		
September 1892 - - -	3	11	3	2	8	—
October „ - - -	2	8	2	—	6	—
November „ - - -	9	56	9	3	38	8
December „ - - -	11	81	12	23	29	40
January 1893 - -	34	225	34	11	78	113
February „ - - -	7	38	7	8	19	12
March „ - - -	8	56	10	3	5	41
April „ - - -	19	117	25	19	9	83
May „ - - -	31	213	33	20	19	161
June „ - - -	25	147	26	6	—	121
July „ - - -	16	86	16	2	—	70
August „ - - -	8	45	10	5	—	35
September „ - - -	5	35	5	2	—	30
October „ - - -	6	54	6	5	—	48
November „ - - -	6	39	6	4	—	33
December „ - - -	3	23	3	—	—	20
	193	1,234	207	113	211	815

So far as the information at my disposal goes I have reasonable ground for the belief that in 19 groups containing in all 52 houses, there was infection from house to house. In 12 of these groups only two houses are concerned, viz.: Nos. 19 and 38; 20 and 70; 21 and 37; 22 and 34; 25 and 36; 32 and 41; 90 and 104; 108 and 127; 109 and 123; 113 and 132; 117 and 131; 176 and 183. The total number of inmates of these 24 houses amounted to 176, of whom 54 were attacked with small-pox, 39 of the cases arising in the 12 houses first invaded and 15 in the 12 invaded secondarily. Again, of this group, the inmates of five houses first to be attacked (Nos. 19, 22, 25, 32, and 109) were quarantined at the hospital, the number of cases of small-pox in these houses amounting to 15, whilst 7 cases occurred in the five houses secondarily invaded, the inmates of three of which were removed to quarantine.

In three groups there were three houses invaded, viz.: Nos. 5, 6, and 10; 80, 94, and 100; 97, 105, and 114. The inmates of these nine houses numbered 50, of whom 13 were attacked with small-pox, five in the houses first invaded, and eight in those invaded secondarily. Of these groups, the inmates of two houses first infected (Nos. 5 and 80) were removed to quarantine at the hospital, there being only one case in each house, and six in the four others secondarily invaded, the inmates of two of which were also removed to quarantine.

In two groups there were four houses, invaded, viz: Nos. 35, 49, 53, and 54; 84, 99, 101, and 106. The inmates of these eight houses amounted to 64, of whom 17 were attacked with small-pox, five arising in the two houses first invaded, and 12 in the six others. In neither instance were the inmates of the house first invaded removed to quarantine, but those of three of the secondarily invaded houses were so dealt with.

There is one group of five invaded houses, viz.: Nos. 87, 95, 120, 130, and 135, numbering 33 inmates, of whom 12 were attacked with small-pox and none removed to quarantine; three of the cases arose in the first house.

There is also one group of six such invaded houses, viz.: Nos. 69, 74, 77, 82, 83, and 86, comprising 36 inmates, of whom 22 were attacked with small-pox, five cases arising in the first invaded house. The members of two of the secondarily infected houses were removed to quarantine at the hospital.

Thus inmates of seven houses were removed to quarantine on the occurrence of small-pox in the house, but not until 9 other families had been more or less directly infected by them. The total number of inmates of these houses was 96, of whom 30 were attacked with small-pox, 17 of those cases occurring in the seven households first invaded.

Per contra, the inmates of 12 invaded households remained at home, and 24 other families were more or less directly infected by them. The total number of inmates of these houses was 263, of whom 88 were attacked with small-pox, 42 of these cases arising in the 12 houses first invaded.

In order to attempt a just comparison it will be necessary to subtract from the latter all those households in which cases occurred unknown to the authorities, until, perhaps, on making inquiry into the origin of other cases those were revealed.

In the case of those households primarily infected, whose members were removed to quarantine at the same time as the case of small-pox was removed to hospital, it will be seen from the subjoined analysis, that such removal took place at periods varying from 4 to 37 days subsequent to the first appearance of small-pox in the house, and that in only two instances, viz., in one where such removal occurred on the 10th day, the other where it occurred on the 38th day, was more than one other household secondarily infected.

In the case of those households primarily infected, whose members were not removed to quarantine, it will be observed that in one instance, where five persons were attacked in the house, not one of which was notified—there were five other houses secondarily infected. In three other instances—the first case arising in the primarily infected houses was not removed (owing to non-notification) and the fact of such houses being infected was not known to the authorities until periods ranging from 17 to 52 days after the first appearance of small-pox in the house. It is not surprising therefore to find that eight other households were infected from these. However, it appears that in one instance (No. 21) small-pox appeared in the house secondarily infected after the removal of two of the cases in the first house; in another (No. 84), after all the cases had been removed from the first house, small-pox appeared in the three houses secondarily infected; and in the third (No. 87) no case had been removed from the first house before the disease made its appearance in the four other houses secondarily attacked, of the remainder, 8 houses, the cases first arising were removed to hospital at periods ranging from 5 to 11 days after the onset of symptoms. There were 11 households secondarily infected from them, 5 of which were in connexion with those in which removal took place on the 10th and 12th days of attack respectively. In each of these instances the first case arising had been removed prior to the appearance of small-pox in other households.

HOUSE-TO-HOUSE INFECTION.

Reference.	Households Primarily infected.			Households Secondarily infected.	
	Day of Attack of Initial Case on which Quarantine established.	Number of Cases arising—		Number.	Cases therein.
		Before Quarantine.	During Quarantine.		
No. 25	5th day	1	—	1	1
„ 109	6th „	1	1	1	1
„ 5	10th „	1	—	2	2
„ 19	12th „	1	2	1	1
„ 22	16th „	2	1	1	1
„ 32	24th „	6	—	1	3
„ 80	38th „	1	—	2	4
7 houses.		13	4	9 houses.	13

Reference.	Households primarily infected.		Of other Cases	Houses secondarily infected.	
	Number of Cases in Household.	Day of Removal of First Case.		Number.	Cases therein.
No. 90	3	6th day	16th and 19th	1	3
„ 20	6	7th „	51st to 56th (one not removed).	1	2
„ 108	1	7th „	—	1	2
„ 176	5	8th „	19th and 20th	1	1
„ 113	6	9th „	20th and 23rd (two not removed).	1	1
„ 117	1	9th „	—	1	1
„ 35	1	10th „	—	3	3
„ 97	3	12th „	25th	2	2
„ 84	4	Not removed	18th and 20th	3	3
„ 21	5	„	28th to 30th	1	1
„ 87	3	„	53rd and 65th	4	9
„ 69	5	„	Not removed.	5	17
12 houses.	43			24	45

The removal to quarantine, which coincided with the removal of the case of small-pox (in a few instances this was not the first case arising in the house), took place at the following periods of the invasion of the household by the disease:—

In 1 house, family removed to quarantine on 2nd day.
,, 4 ,, ,, ,, ,, 3rd ,,
,, 7 ,, ,, ,, ,, 4th ,,
,, 9 ,, ,, ,, ,, 5th ,,
,, 7 ,, ,, ,, ,, 6th ,,
,, 7 ,, ,, ,, ,, 7th ,,
,, 2 ,, ,, ,, ,, 8th ,,
,, 1 ,, ,, ,, ,, 10th ,,
,, 1 ,, ,, ,, ,, 12th ,,
,, 1 ,, ,, ,, ,, 13th ,,
,, 1 ,, ,, ,, ,, 19th ,,
,, 1 ,, ,, ,, ,, 21st ,,
,, 1 ,, ,, ,, ,, 22nd ,,
,, 1 ,, ,, ,, ,, 23rd ,,
,, 1 ,, ,, ,, ,, 38th ,,
45

The period of quarantine during which the 15 cases arising therein developed was, on 4th day, 1 case; 5th day, 2 cases; 7th day, 1 case; 9th day, 2 cases; 10th day, 6 cases; 11th day, 1 case; 13th day, 1 case; 14th day, 1 case; whilst of the 4 persons who were taken ill after leaving quarantine, they sickened on 6 (?), 7, 8, and 12 days from that date respectively.

HOSPITAL QUARANTINE.

Month.	Reference to House List.	No. of Inmates.	Cases arising at Home.*	Numbers sent into Quarantine.	Attacked in Quarantine.	Day of stay in Quarantine.	Attacked after Quarantine.
Sept. 1892	3	3	No. 3	2	—	—	No. 5.—8 days after.
,, ,,	4	6	No. 6	5	No. 7	10th	
Nov. ,,	12	7	No. 23	5	—	—	No. 32.—? 6 days after.
,, ,,	14	8	No. 26	7	No. 31	11th	
Dec. ,,	19	6	No. 33	5	No. 44 No. 59	10th 14th	
,, ,,	22	7	Nos. 39, 43, 48	1			
	23	5	No. 40	4	No. 51 No. 52	10th 10th	No. 92.—7 days after.
	26	9	Nos. 45, 64	7	No. 82 No. 85 No. 86	4th 5th 5th	
Jan. 1893	32	8	Nos. 55, 90, 91, 93, 101	3			
	41	7	Nos. 72, 104	5	No. 132	9th	
	50	8	No. 88	7	No. 119 No. 124	7th 9th	
	59	5	No. 110	4	No. 130	13th	
Feb. ,,	67	7	No. 129	6	No. 136	10th	
	70	5	No. 135	4	—	—	No. 155.— ? 12 days after.
March ,,	77	8	Nos. 158, 165, 177	5			
April ,,	81	6	No. 163	5	No. 185	10th	
,, ,,	83	7	Nos. 165, 173, 174, 179, 190.	1			
,, ,,	85	5	Nos. 167, 169, 170	2			
May ,,	109	8	Nos. 213, 238	1			
	19 houses	125	36	79	15	—	4

Of the 36 cases arising "at home" 25 were "initial," 11 "later" cases.

In the analysis of the facts regarding the incidence of small-pox upon the 193 households under review—it will be more appropriate to separate them into two main groups—differing slightly from those above given, according as to whether or not cases occurred in the house after an interval sufficient to justify the inference that the later arising cases may have acquired the disease from the initial case. It must, of course, be conceded that such a division is somewhat arbitrary and hypothetical, but in the main it is likely to be accurate; and may enable some useful comparisons to be made.

Group I.—This group comprises all those households in which there is no sufficient evidence that any secondary infection arose in the house from the first to be attacked. It will include the 127 houses in which a single case of small-pox only occurred, and six in which there was more than one case.

Group II.—This group comprises those households in which there is every probability that the cases arising subsequently to the first infected by it.* It will include 60 households.

—	Group I. (133 Households.)	Group II. (60 Households.)	
		Initial.	Later.
Attacked with small-pox -	141	66	113
Not attacked - - -	701	213	
Total - - -	842	392	

These groups may be again sub-divided, as before, into series A and B, according as to whether the "initial" case was removed to hospital or remained at home. The latter series (B) contains all those cases which were not notified, and which passed unrecognised, until the subsequent illness of other members of the household led to their discovery.

—	Group I.		Group II.	
	Series A.	Series B.	Series A.	Series B.
Attacked - -	134	7	Initial - 50 Later - 67	16 37
Not attacked -	676	34	165	48
	801	41	291	101

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* There is only one exception to this where apparently re-infection of a household occurred, viz.:—No. 149

The attack rates in each series are therefore :—

Group I. (all cases) - - -	17·9 per cent.
A. Initial case removed - -	16·7 „
A. „ „ remained - -	17· „
Group II. (later cases only, exclusive of initial cases) - - -	34·3 „
A. Initial case removed - -	31·5 „
B. „ „ remained - -	43·5 „

The tables already given (XXIII. and XXIV.) which showed the age-distribution and state as to vaccination of the inmates of houses yielding single and multiple cases respectively, require but slight modification to be adapted to the two groups here dealt with, owing to the transference to Group I. of six households in which more than one case occurred. The annexed Tables XXV. and XXVI. give the modified statistics, which are utilised in the subsequent analysis.

Table XXV.

Group I. (133 houses).

Houses with single cases, 127 ; with multiple cases, 6.

—	Attacked.			Not Attacked.					All Inmates.				
							Unvaccinated.					Unvaccinated.	
	Vaccinated.	Under Vaccination.	Unvaccinated.	Vaccinated.	No Information.	Under Vaccination.	Vaccinated on Removal of Case.	Remained.	Vaccinated.	No Information.	Under Vaccination.	Vaccinated on Removal of Case.	Remained.
Under 1 year	—	—	3	1	—	—	—	16	1	—	—	—	19
1 to 5 years	—	—	5	12	—	1	7	52	12	—	1	7	57
5 to 10 „	—	—	20	53	—	—	10	47	53	—		10	67
10 to 15 „	5	—	9	77	—	2	2	16	82	—	2	2	25
15 to 20 „	11	1	4	79	—	1	2	7	90	—	2	2	11
20 to 30 „	43	—	7	114	—	—	—	2	157	—	—	—	9
30 to 40 „	21	—	—	58	—	—	—	4	79	—	—	—	4
40 to 50 „	7	—	2	73	4	—	—	2	80	4	—	—	4
50 to 60 „	3	—	—	37	1	—	—	—	40	1	—	—	—
60 to 70 „	—	—	—	10	—	—	—	—	10	—	—	—	—
70 and ever	—	—	—	2	—	—	—	—	2	—	—	—	—
Age not ascertained.	—	—	—	9	—	—	—	—	9	—	—	—	—
	90	1	50	525	5	4	21	146	615	5	5	21	196

Table XXVI.

Group II. (60 houses).

—	Attacked.			Not Attacked.			All Inmates.		
	Vaccinated.	Under Vaccination.	Unvaccinated.	Vaccinated.	Under Vaccination.	Unvaccinated.	Vaccinated.	Under Vaccination.	Unvaccinated.
Under 1 year -	—	1	3	—	1	8	—	2	11
1 to 5 years -	—	1	25	—	1	22	—	2	47
5 to 10 „ -	2	1	41	10	4	14	12	5	55
10 to 15 „ -	4	—	18	26	2	10	30	2	28
15 to 20 „ -	13	—	4	20	1	4	33	1	8
20 to 30 „ -	28	—	4	18	—	—	46	—	4
30 to 40 „ -	19	—	1	32	—	—	51	—	1
40 to 50 „ -	10	—	—	28	—	—	38	—	—
50 to 60 „ -	3	—	—	6	—	—	9	—	—
60 to 70 „ -	1	—	—	4	—	—	5	—	—
70 and over -	—	—	—	2	—	—	2	—	—
	80	3	96	146	9	58	226	12	154

The above data are diagrammatically illustrated in Charts VI. and VII., which show the relative incidence of the disease in each vaccination class and at each age-period. Thus, of the 1,234 persons, 320 of whom were attacked with small-pox, 841 were vaccinated, of whom 170 were attacked, a rate of 20·2 per cent. ; whereas 371 were unvaccinated, of whom 146 were attacked, a rate of 39·2 per cent.

Of the *vaccinated*, at ages 0 to 10 years, 78, of whom 2 attacked ; a rate of 2·5 per cent.

10 to 30 years, 438, of whom 104 attacked ; a rate of 23·7 per cent.

30 years and over, 316, of whom 64 attacked ; a rate of 20·2 per cent.

And of the *unvaccinated*, at ages 0 to 10 years, 273 of whom 97 attacked ; a rate of 35·5 per cent.

At ages 10 to 30 years, 88, of whom 45 attacked ; a rate of 51·5 per cent.

At ages 30 years and over, 10, of whom 4 attacked ; a rate of 40 per cent.

These figures require to be slightly modified by the inclusion of reference to these who are stated to have had small-pox prior to this outbreak. There were in all 19 such persons,* 12 of whom were vaccinated, and none of whom suffered from small-pox on this occasion. Eliminating, the rate amongst the vaccinated would be raised to 20·5 per cent and amongst the unvaccinated to 39·8 per cent.; and as they all were individuals above the age of 30 years, the attack rates in this age-period would be raised to vaccinated, 21·5 per cent. unvaccinated, 80 per cent.

It will also be seen (Table XXVII.) that of 115 persons known to have been re-vaccinated, 6 were attacked with small-pox—a rate of 5·2 per cent. The dates of their re-vaccination were from 2 to 30 years previously.

In the remaining tables which have been compiled, the general statistics are sub-divided first, amongst the Groups I and II., already defined, and secondly, with reference to the fact whether in each group the initial cases arising in the houses were removed to hospital (A) or remained at home (B.)

Table XXVII.

Vaccination Data of Members of 193 Invaded Households.

—		Attacked.	Not attacked.	—
Vaccinated - - - -		170	671	841
Re-vaccinated - - -		6	109	—
Previous small-pox - - -		—	12	—
Under Vaccination - - -		4	13	17
No information - - -		—	5	5
Previous small-pox - - -		—	2	—
Unvaccinated	Vaccinated on removal of case.	—	21 } 225	371
	Remained unvaccinated.	146	204	
Previous small-pox - - -		—	5	—
		320	914	1,234

Separating these into the two groups above defined, it is seen (Table XXVIII.) that in *Group I., i.e.*, households in which no case occurred subsequent to the first attacked, the incidence on the *vaccinated* members was 14·6 per cent. ; on the *unvaccinated* 23·0 per cent. If those who had previously had small-pox be subtracted, these rates would be 14·7 per cent. and 23·5 per cent. respectively.

In Group II. where cases arose subsequent to the "initial" ones, the incidence of the *later* arising cases, amongst the *vaccinated* members, was 25·8 per cent. (or 27 per cent. if those previously having had small-pox be excluded) ; and amongst the *unvaccinated* members it was 46·4 per cent.

But if all the cases (initial and later) be reckoned, the rates of incidence in Group II. amount to 35·4 per cent. for the vaccinated, and 62·3 per cent. for the unvaccinated class.

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* I have not included case No. 60 who was apparently re-infected (*v. ante*). If this case was reckoned it would raise the total numbers to 240 and 321 respectively—as there were five other inmates of her house who would have to be reckoned twice over.

Table XXVIII.

—	Group I.			Group II.				—
	133 Households.			60 Households.				
	Attacked.	Not Attacked.	Total.	Attacked.		Not attacked.	Total.	
				Initial.	Later.			
Vaccinated	90	525	615	29	51	146	226	841
Re-vaccinated	1	83	—	1	4	26	—	—
Previous small-pox	—	4	—	—	—	8	—	—
Under vaccination	1	4	5	—	3	9	12	17
No information	—	5	5	—	—	—	—	5
Previous small-pox	—	2	—	—	—	—	—	—
Unvaccinated :—								
Vaccinated on removal of case.	—	21	217	37	59	58	154	371
Remained unvaccinated.	50	146						
Previous small-pox	—	5	—	—	—	—	—	—
	141	701	842	66	113	213	392	1,234

In Tables XXIX. and XXX. the same figures as these given in Table XXVIII. are distributed amongst four age-periods, so that it is possible to calculate the incidence of the disease, *i.e.*, the attack-rates amongst the vaccinated and unvaccinated members of each of those communities at different periods of life.

Thus, in Group I., it will be seen that *under the age of one year* there was one *vaccinated* infant who did not have the disease; and 19 *unvaccinated*, three of whom were attacked, *i.e.*, an incidence of 15·8 per cent. (*nearly*). At age one to ten years there were 65 children who were *vaccinated*, none of whom were attacked by small-pox; and 141 *unvaccinated* of whom 25 were attacked, an incidence of 17·7 per cent. At ages 10 to 30 years the *vaccinated* were 329 in in number, and 59 were attacked, an incidence of 18·1 per cent; the *unvaccinated* were 45, of whom 20 were attacked, an incidence of 44·4 per cent. Lastly, at ages 30 years and over, of 211 who were *vaccinated*, 31 were attacked, an incidence of 14·6 per cent. (or nearly 15 per cent., if those who previously had had small-pox be subtracted); and of eight who were *unvaccinated*, two were attacked, an incidence of 25·0 per cent. (which is raised to 66·6 per cent. if those who previously had had small-pox be subtracted).

The rates are, of course, larger in Group II., where the number of cases is proportionately higher. Thus, taking all the cases (Table XXX.), it is seen that under one year of age there were 11 *unvaccinated*, of whom three were attacked, an incidence of 27·2 per cent. At one to ten years, 12 were *vaccinated*, two attacked, an incidence of 16·6 per cent., and 102 *unvaccinated*, 66 attacked, an incidence of 64·7 per cent. At 10 to 30 years 109 were *vaccinated*, of whom 45 were attacked, an incidence of 40·7 per cent. ; 40 were *unvaccinated*, 26 attacked, an incidence of 65·0 per cent. At 30 years and over, 105 were *vaccinated*, 33 attacked, an incidence of 31·4 per cent. (raised to 34 per cent. on subtracting those who had previously had small-pox). There was one *unvaccinated* subject who was attacked.

Table XXIX.

Group I.—133 houses with 842 inmates, of whom 141 attacked.

—	Under 1 year.		1 to 10 years.		10 to 30 years.		30 years and upwards.		Age not ascertained.		All Ages.	
	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.
Vaccinated	—	1	—	65	59	270	31	180	—	9	90	525
Re-vaccinated	—	—	—	2	—	35	1	37	—	9	1	83
Previous small-pox.	—	—	—	—	—	—	—	4	—	—	—	4
No information on vaccination.	—	—	—	—	—	—	—	5	—	—	—	5
Previous small-pox.	—	—	—	—	—	—	—	2	—	—	—	2
Under vaccination.	—	—	—	1	1	3	—	—	—	—	1	4
Unvaccinated :—												
Vaccinated at once.	—	—	—	17	—	4	—	—	—	—	—	21
Not vaccinated	3	16	25	99	20	25	2	6	—	—	50	146
Previous small-pox.	—	—	—	—	—	—	—	5	—	—	—	5
	3	17	25	182	80	302	33	191	—	9	141	701

Total re-vaccinated, 84, 1 of whom attacked by small-pox.

Total who had had small-pox previously, 11.

Table XXX.

Group II.—60 houses with 392 inmates, of whom 179 attacked.

—	Under 1 year.		1 to 10 years.		10 to 30 years.		30 years and upwards.		All Ages.	
	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.
Vaccinated	—	—	2	10	45	64	33	72	80	146
Re-vaccinated	—	—	—	2	2	10	3	14	5	26
Previous small-pox	—	—	—	—	—	—	—	8	—	8
Under vaccination	1	1	2	5	—	3	—	—	3	9
Unvaccinated	3	8	66	36	26	14	1	—	96	58
	4	9	70	51	71	81	34	72	179	213

Total re-vaccinated, 31, 5 of whom attacked by small-pox.

Total who had had small-pox previously, 8.

Vaccination and Measures of Isolation.

In order to determine whether any appreciable influence was exerted upon the incidence of the disease by removal of the initial cases to hospital, the cases have been distributed into two series, some of which fall under each of the groups above considered. Series A. comprises those households from which the initial cases were removed to hospital; Series B. those in which such cases remained at home. The first group contains 1,092 members—260 of whom were attacked by small-pox; the second, 142 of whom 60 were attacked.

Explanation of Chart VII.:—

This chart is intended to illustrate the condition as to vaccination of 1,234 *members of* 193 *households invaded by small-pox. Each square represents one individual—the shaded squares being those who were attacked with small-pox, the open squares those who were not attacked. A previous attack of small-pox is indicated by the sign* ⊙. *The fatal cases are indicated thus* +. *The chart shows that of the total number*—1,234 *persons*—320 *were attacked with small-pox, of whom* 17 *died. Of these numbers there were :—*

Vaccinated, 841 *: attacked,* 170*; not attacked,* 671*; died,* 1.
No information as to vaccination, 5 *: none of whom were attacked.*
Under vaccination, 17 *: attacked,* 4 *; not attacked,* 13.

Unvaccinated :—

- (*a.*) *Vaccinated on removal of previous case,* 21 *: none of whom attacked.*
- (*b.*) *Not vaccinated,* 350*: attacked,* 146*; not attacked,* 204*; died,* 16.

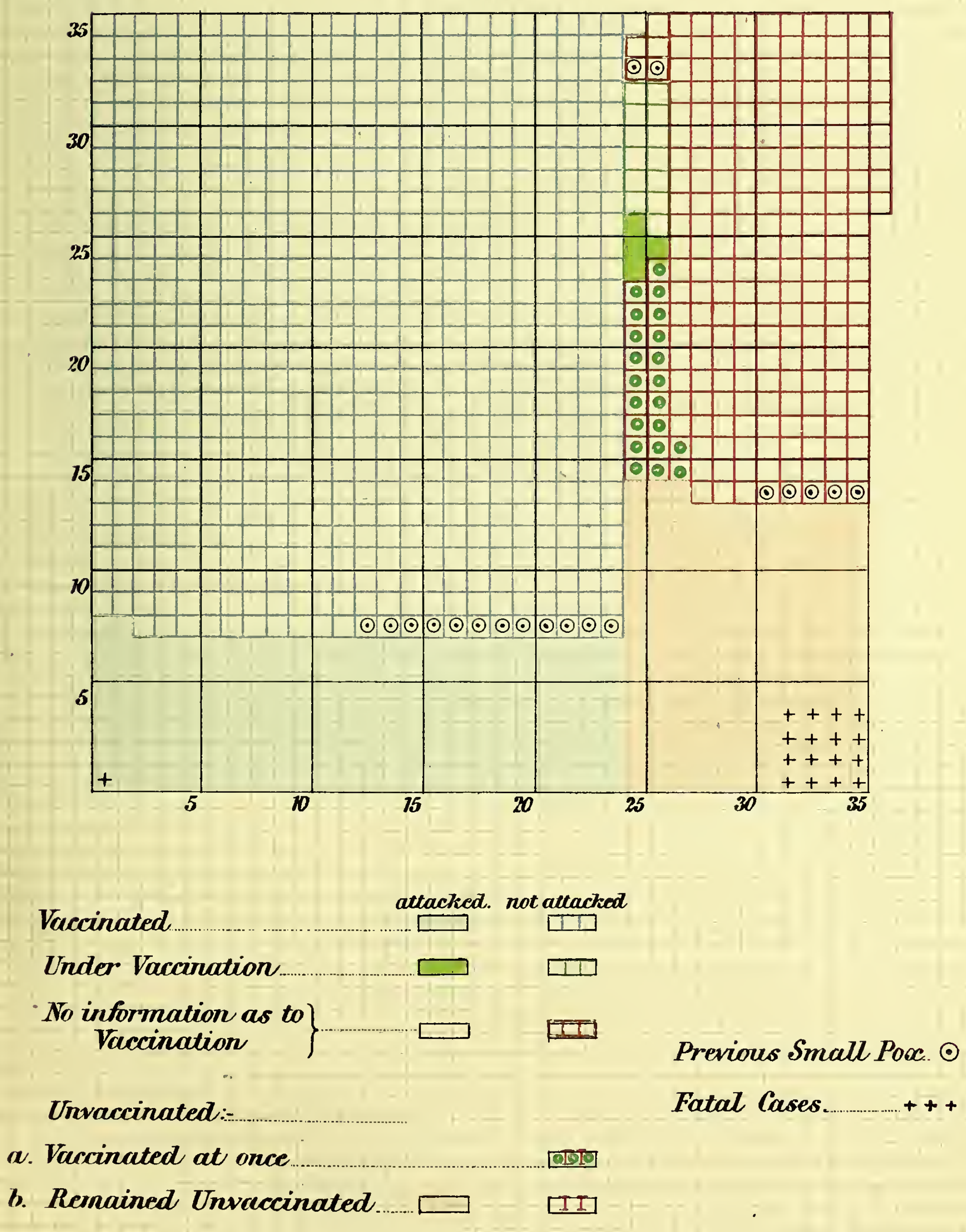
A previous attack of small-pox was alleged in 12 *of the vaccinated;* 2 *of those in whom no information as to vaccination was obtained; and in* 5 *of the unvaccinated.*

Explanation of Chart VIII.:—

This chart deals with the same statistics as Chart VI., except that the 1,234 *persons are grouped in age-periods.*

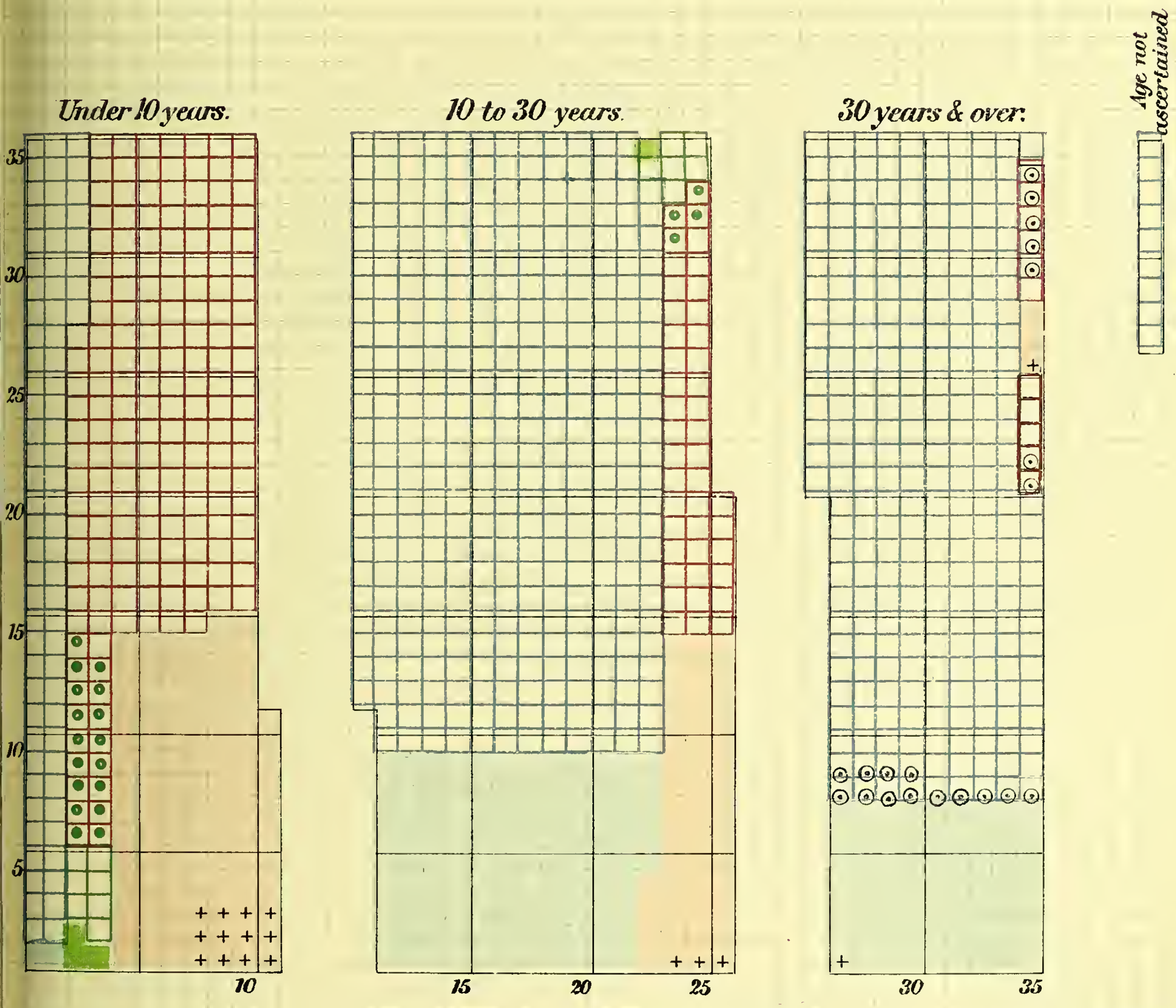
UNDER 10 YEARS OF AGE—361*: attacked,* 102*; not attacked,* 259.
  Vaccinated, 78 *: attacked,* 2*; not attacked,* 76.
  Under vaccination, 10*: attacked,* 3*; not attacked,* 7.
Unvaccinated :—
  (*a.*) *Vaccinated on removal of case,* 17*: none of whom were attacked.*
  (*b.*) *Not vaccinated,* 256*; attacked,* 97*; not attacked,* 159*; died,* 12.
10 TO 30 YEARS—533*: attacked,* 151*; not attacked,* 383.
  Vaccinated, 438 *: attacked,* 104*: not attacked,* 334.
  Under vaccination, 7 *: attacked,* 1*; not attacked,* 6.
Unvaccinated :—
  (*a.*) *Vaccinated on removal of case,* 4*: none of whom were attacked.*
  (*b.*) *Not vaccinated,* 84*: attacked,* 46*; not attacked,* 39*; died,* 3.
30 YEARS AND OVER—331*: attacked,* 67*; not attacked,* 263.
  Vaccinated. 316*: attacked,* 64*; not attacked,* 252*; died,* 1.
  No information on vaccination, 5*: none attacked.*
  Unvaccinated, 10*: attacked,* 3*; not attacked,* 6*; died,* 1.
AGE NOT ASCERTAINED—9.
  Vaccinated, 9*; none attacked.*

VACCINATION DATA OF 1234 MEMBERS OF HOUSEHOLDS INVADED BY SMALL POX.



To face page 62 i.

VACCINATION DATA OF 1234 MEMBERS OF HOUSEHOLDS, INVADED BY SMALL POX, ARRANGED IN 3 AGE PERIODS.



For key see Chart VII; facing page 62.

TABLE XXXI.
ISOLATION AND VACCINATION.

—	Series A.		Series B.		Total.		—
	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.	
Vaccinated - -	133	599	37	72	170	671	841
Re-vaccinated - -	5	89	1	20	6	109	—
Previous small-pox -	—	12	—	—	—	12	—
Under vaccination -	4	13	—	—	4	13	17
No information on vaccination - - -	—	5	—	—	—	5	5
Previous small-pox -	—	2	—	—	—	2	—
Unvaccinated :— Vaccinated on removal of case - - -	—	19	—	2	—	21	371
Not vaccinated - -	123	196	23	8	146	204	
Previous small-pox -	—	5	—	—	—	5	—
	260	832	60	82	320	914	1,234
Re-vaccinated - -	5	89	1	20	6	109	115
Previous small-pox -	—	19	—	—	—	19	19

It will be seen that the attack-rate or incidence for the *vaccinated* class is in Series A., 18 · 1 per cent. ; in Series B., 34 per cent. ; that for the *unvaccinated* class is, in Series A., 36 · 4 per cent. ; in Series B., 74 · 2 per cent. ; showing the far greater proportion who suffered amongst those when the initial cases remained at home.

TABLE XXXII.
INITIAL CASES REMOVED TO HOSPITAL (SERIES A.).

—	Group I.			Group II.				
	126 Households.			45 Households.				
	Attacked.	Not Attacked.	Total.	Initial.	Later.	Not Attacked.	Total.	—
Vaccinated -	85	494	579	15	33	105	153	732
Re-vaccinated -	1	71	—	1	3	18	—	—
Previous small-pox.	—	4	—	—	—	8	—	—
Under vaccination	1	4	5	—	3	9	12	17
No information -	—	5	5	—	—	—	—	5
Previous small-pox.	—	2	—	—	—	—	—	—
Unvaccinated:— Vaccinated on removal of case.	—	19	212	35	40	51	126	319
Remained unvaccinated.	48	145						
Previous small-pox.	—	5	—	—	—	—	—	—
	134	467	801	50	76	165	291	1,092

TABLE XXXIII.
INITIAL CASES REMAINED AT HOME (SERIES B.).

—	Group I.			Group II.				
	7 Households.			15 Households.				
	Attacked.	Not Attacked.	Total.	Initial.	Later.	Not Attacked.	Total.	—
Vaccinated -	5	31	36	14	18	41	73	110
Re-vaccination	—	12	—	—	1	8	—	—
Under vaccination	—	—	—	—	—	—	—	—
Unvaccinated :—								
Vaccinated at once.	—	2	2	—	—	—	—	—
Remained unvaccinated.	2	1	3	2	19	7	28	30
	7	34	41	16	37	48	101	142

In Tables XXXII. and XXXIII. these series have been apportioned in each of the two main groups, so as to afford comparison between those households in which the cases remained at home, or were removed, in respect to the liability to cases subsequently arising in the house. The main fact has already been dwelt on in dealing with single and multiple cases, but the respective incidence in the vaccinated and unvaccinated may here be added, in the following tabular statement :—

INCIDENCE of SMALL-POX on the VACCINATED and UNVACCINATED MEMBERS of HOUSEHOLDS.

Series A. (171 *Households*).

—	Vaccinated Rate.	Unvaccinated Rate.
Group I. (126 households) - -	14·6 per cent.	22·6 per cent.
Group II. (45 households), all cases -	31·3 „	59·5 „
„ „ later cases only.	23·9 „	43·9 „

Series B. (22 *Households*).

—	Vaccinated Rate.	Unvaccinated Rate.
Group I. (7 households) - -	13·5 per cent.	66·6 per cent.
Group II. (15 households), all cases -	43·8 „	75·0 „
„ „ later cases only.	30·5 „	73·3 „

Lastly, in Tables XXXIV. to XXXVII., these series are sub-divided amongst age-periods, but the numbers in Series B. are too small to afford any just basis of comparison in this respect, and I may, therefore, leave them without further comment.

TABLE XXXIV.
GROUP I. SERIES A.—INITIAL CASES REMOVED TO HOSPITAL.
(126 households, 801 members, 134 attacked.)

—	Under 1 year.		1 to 10 years.		10 to 30 years.		30 years and upwards.		Age not ascertained.		All Ages.	
	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not attacked.
Vaccinated -	—	1	—	64	56	248	29	172	—	9	85	494
Re-vaccinated	—	—	—	2	—	27	1	33	—	9	1	71
Previous small-pox.	—	—	—	—	—	—	—	4	—	—	—	4
No information on vaccination.	—	—	—	—	—	—	—	5	—	—	—	5
Previous small-pox.	—	—	—	—	—	—	—	2	—	—	—	2
Under vaccination.	—	—	—	1	1	3	—	—	—	—	1	4
Unvaccinated : Vaccinated at once.	—	—	—	15	—	4	—	—	—	—	—	19
Not vaccinated	2	16	25	99	19	24	2	6	—	—	48	145
Previous small-pox.	—	—	—	—	—	—	—	5	—	—	—	5
	2	17	25	179	76	279	31	183	—	9	134	667

Re-vaccinated, 72. (One attacked with small-pox.)
Previous small-pox, 11.

TABLE XXXV.
GROUP I. SERIES B.—INITIAL CASES REMAINED AT HOME.
(7 households, 41 members, 7 attacked.)

—	Under 1 year.		1 to 10 years.		10 to 30 years.		30 years and upwards.		All Ages.	
	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.
Vaccinated - -	—	—	—	1	3	22	2	8	5	31
Re-vaccinated -	—	—	—	—	—	8	—	4	—	12
Unvaccinated : Vaccinated at once -	—	—	—	2	—	—	—	—	—	2
Not vaccinated -	1	—	—	—	1	1	—	—	2	1
	1	—	—	3	4	23	2	8	7	34

Re-vaccinated, 12.

TABLE XXXVI.

GROUP II. SERIES A.—INITIAL CASES REMOVED TO HOSPITAL.

(45 households ; 291 members ; 126 attacked.)

—	Under 1 Year.		1 to 10 Years.		10 to 30 Years.		30 Years upwards.		All Ages.	
	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.
Vaccinated - - -	—	—	1	8	22	36	25	61	47	105
Re-vaccinated - -	—	—	—	—	1	6	3	12	4	18
Previous small-pox -	—	—	—	—	—	—	—	8	—	8
Under vaccination -	1	1	2	5	—	3	—	—	8	9
Unvaccinated - -	3	5	46	32	25	14	1	—	76	51
	4	6	49	45	47	53	26	61	126	165

Re-vaccinated, 28 (4 attacked with small-pox).
Previous small-pox, 8.

TABLE XXXVII.

GROUP II. SERIES B.—INITIAL CASES REMAINED AT HOME.

(15 households ; 101 members ; 53 attacked.

—	Under 1 Year.		1 to 10 Years.		10 to 30 Years.		30 Years up wards.		All Ages.	
	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.	Attacked.	Not Attacked.
Vaccinated - - -	—	—	1	2	23	28	8	11	32	41
Re-vaccinated - -	—	—	—	2	1	4	—	2	1	8
Under vaccination -	—	—	—	—	—	—	—	—	—	—
Unvaccinated - -	—	3	20	4	1	—	—	—	21	7
	—	3	21	6	24	28	8	11	53	48

Re-vaccinated, 9 (1 attacked with small-pox).

INCIDENCE of SMALL-POX on the VACCINATED and UNVACCINATED INMATES of 193 INVADED HOUSES.

From the particulars already furnished, it is possible to calculate the rates of incidence of small-pox upon the vaccinated and unvaccinated members of households, and to contrast these rates with the rates of proportion between the two classes of all members irrespective of age. Thus we have the following data :—(1) the number of invaded households, (2) the sizes of these households, (3) the number attacked in each, (4) the number of persons who were known to have been vaccinated, and of those who were known to be unvaccinated, as well as the number of those in each class who were attacked with the disease.

It will further be of interest to contrast in these particulars the houses of various size, and for this purpose we may divide them into two groups, namely, those having six inmates or less, and those having more than six inmates.

1. In 193 houses, having 1,234 inmates, there were 320 attacked with small-pox, an incidence rate of 259 per 1,000.

2. Of these 1,234 persons, 841 were vaccinated, a proportion of 681 per 1,000; 371 were unvaccinated, a proportion of 300 per 1,000.

3. Of the *vaccinated*, 170 were attacked with small-pox, an incidence rate of 202 per 1,000. Of the *unvaccinated*, 146 were attacked, an incidence rate of 393 per 1,000.

Houses with Six Inmates or less.

1. In 109 houses, having 500 inmates, 160 were attacked with small-pox, an incidence rate of 320 per 1,000.

2. Of these 500 persons, 354 were vaccinated, a proportion of 708 per 1,000. 140 were unvaccinated, a proportion of 280 per 1,000.

3. Of the *vaccinated*, 95 were attacked with small-pox, an incidence rate of 268 per 1,000. Of the *unvaccinated*, 63 were attacked an incidence rate of 450 per 1,000.

Houses with more than Six Inmates.

1. In 84 houses, having 734 inmates, 160 were attacked with small-pox, an incidence rate of 218 per 1,000.

2. Of these 734 persons, 487 were vaccinated, a proportion of 663 per 1,000. 231 were unvaccinated, a proportion of 314 per 1,000.

3. Of the *vaccinated*, 75 were attacked with small-pox, an incidence rate of 154 per 1,000. Of the *unvaccinated*, 83 were attacked, an incidence rate of 359 per 1,000.

It may be of interest to compare the small-pox incidence in relation to the proportion of vaccinated and unvaccinated persons in these households, where (*a*) every one attacked was vaccinated, (*b*) every one attacked was unvaccinated, and (*c*) where those attacked included some vaccinated and some unvaccinated. We have thus three groups :—

> *Group A.*—Houses in which all attacked with small-pox were *vaccinated*. This group comprises 91 houses.
>
> *Group B.*—Houses in which all attacked with small-pox were *unvaccinated*. This group comprises 61 houses.
>
> *Group C.*—Houses in which those attacked with small-pox were, some of them *vaccinated* and some *unvaccinated*. This group comprises 41 houses.

GROUP A.

1. In 91 houses, having 557 inmates, 109 were attacked with small-pox, an incidence rate of 195 per 1,000.

2. Of these 557 persons, 478 were vaccinated, a proportion of 858 per 1,000 ; 75 were unvaccinated, a proportion of 132 per 1,000.

3. Of the *vaccinated*, 109 were attacked with small-pox, an incidence rate of 228 per 1,000.

Houses with Six Inmates or less.

1. In 59 houses, having 258 inmates, 70 were attacked with small-pox, an incidence rate of 271 per 1,000.

2. Of these 258 persons, 221 were vaccinated, a proportion of 139 per 1,000 ; 36 were unvaccinated, a proportion of 139 per 1,000.

3. Of the *vaccinated*, 70 were attacked with small-pox, an incidence rate or 317 per 1,000.

Houses with more than Six Inmates.

1. In 32 houses, having 299 inmates, 39 were attacked with small-pox, an incidence rate of 130 per 1,000.

2. Of these 299 persons, 257 were vaccinated, a proportion of 859 per 1,000; 39 were unvaccinated, a proportion of 130 per 1,000.

3. Of the *vaccinated*, 39 were attacked with small-pox, an incidence rate of 155 per 1,000.

GROUP B.

1. In 61 houses, having 403 inmates, 86 were attacked with small-pox, an incidence rate of 213 per 1,000.

2. Of these 403 persons, 199 were vaccinated, a proportion of 493 per 1,000 ; 199 were unvaccinated, a proportion of 493 per 1,000.

3. Of the *unvaccinated*, 86 were attacked with small-pox, an incidence rate of 432 per 1,000.

Houses with Six Inmates or less.

1. In 30 houses, having 141 inmates, 37 were attacked with small-pox, an incidence rate of 262 per 1,000.

2. Of these 141 persons, 76 were vaccinated, a proportion of 539 per 1,000; 64 were unvaccinated, a proportion of 454 per 1,000.

3. Of the *unvaccinated*, 37 were attacked with small-pox, an incidence rate of 578 per 1,000.

Houses with more than Six Inmates.

1. In 31 houses, having 262 inmates, 49 were attacked with small-pox, an incidence rate of 187 per 1,000.

2. Of these 262 persons, 123 were vaccinated, a proportion of 469 per 1,000 ; 135 were unvaccinated, a proportion of 515 per 1,000.

3. Of the *unvaccinated*, 49 were attacked with small-pox, an incidence rate of 363 per 1,000.

Group C.

1. In 41 houses, having 274 inmates, 125 were attacked with small-pox, an incidence rate of 456 per 1,000.

2. Of these 274 persons, 164 were vaccinated, a proportion of 598 per 1,000; 97 were unvaccinated, a proportion of 354 per 1,000.

3. Of the *vaccinated*, 61 were attacked with small-pox, an incidence rate of 372 per 1,000; of the *unvaccinated*, 60 were attacked, an incidence rate of 618 per 1,000.

Houses with Six Inmates or less.

1. In 20 houses having 101 inmates, 53 were attacked with small-pox, an incidence rate of 524 per 1,000.

2. Of these 101 persons, 57 were vaccinated, a proportion of 564 per 1,000; 40 were unvaccinated, a proportion of 396 per 1,000.

3. Of the *vaccinated*, 25 were attacked with small-pox, an incidence rate of 438 per 1,000; of the *unvaccinated*, 26 were attacked, an incidence rate of 650 per 1,000.

Houses with more than Six Inmates.

1. In 21 houses, having 173 inmates, 72 were attacked with small-pox, an incidence rate of 416 per 1,000.

2. Of these 173 persons, 107 were vaccinated, a proportion of 618 per 1,000; 57 were unvaccinated, a proportion of 330 per 1,000.

3. Of the *vaccinated*, 36 were attacked with small-pox, an incidence rate of 336 per 1,000; of the *unvaccinated*, 34 were attacked, an incidence rate of 596 per 1,000.

---

§ 15. *Supplementary Note.*

It may be of interest to contrast in a few particulars the experience of this outbreak of small-pox at Leicester, with that previously reported on at the Dewsbury Union, in 1891 to 1892. The following statistics show the chief points of comparison to which attention may be drawn.

COMPARISON of SMALL-POX STATISTICS.

—	LEICESTER, 1892–93.	DEWSBURY UNION, 1891–92.
Number of Cases -	357	1,029
Males - -	181	521
Females - -	176	508
Death-rate - -	21 or 5·8 per cent.	110 or 10·7 per cent.

Age-Periods.	Cases.	Per cent.	Deaths.	Fatality.	Cases.	Per cent.	Deaths.	Fatality.
Under 1 year -	7	1·9	2	% 28·6	29	2·8	19	% 65·5
1 to 10 years -	102	28·5	13	12·7	195	18·9	38	19·4
10 to 30 „ -	161	45·1	3	3·4	560	54·4	33	5·9
30 and over -	87	24·3	3	3·4	238	23·1	20	8·4
Age not ascertained	—	—	—	—	7	0·6	—	—
	357	—	21	—	1,029	—	110	—

RELATIVE MORTALITY at DIFFERENT AGES.

Under 1 year -	9·5 per cent.	17·2 per cent.
1 to 10 years -	61·9 „	34·5 „
10 to 30 „ -	14·3 „	30·0 „
30 and over -	14·3 „	18·1 „

STATISTICS of the UNVACCINATED.

Total Unvaccinated	154 or 43·1 per cent.	346 or 33·6 per cent.
Deaths - -	19 or 12·4 „	89 or 25·7 „

Age Periods.	No. Attacked.	Proportion of all Cases.	Proportion of all Unvaccinated.	No. Attacked.	Proportion of all Cases.	Proportion of all Unvaccinated.
Under 1 year -	6	% 85·6	% 3·2	21	% 72·4	% 6·0
1 to 10 years -	98	96·1	64·7	137	70·2	39·6
10 to 30 „ -	46	28·5	29·4	165	29·4	47·7
30 and over -	4	4·6	2·6	22	9·2	6·3
Age not ascertained	—	—	—	1	—	0·3
	153	—	—	346	—	—

STATISTICS of SMALL-POX in INVADED HOUSES of which particulars obtained).

—	LEICESTER.	DEWSBURY UNION.
Invaded Houses -	193	544
Total Inmates -	1,234	3,000
Attacked with Small-pox.	320 or 25·9 per cent.	887 or 29·5 per cent.

At Ages.	Attacked.	Not Attacked.	Rate.	Attacked.	Not Attacked.	Rate.
Under 1 year. -	7	26	% 21·2	25	50	% 33·3
1 to 10 years -	95	233	28·9	178	476	27·2
10 to 30 „ -	151	383	28·2	482	867	35·7
30 and over -	67	268	20·3	202	699	32·3
Age not ascertained	—	9	—	—	21	—
	320	914	—	887	2,113	—

Single cases in -	127 Houses.	355 Houses.
Total Inmates -	795	1,840
Attacked with Small-pox.	127 or 16 per cent.	355 or 19·2 per cent.
Multiple cases in -	66 Houses.	189 Houses.
Total Inmates -	439	1,160
Attacked with Small-pox.	193 or 44 per cent.	532 or 45·8 per cent.

PROPORTIONS of the UNVACCINATED in above HOUSEHOLDS.

—	Attacked.	Not Attacked.	Attacked.	Not Attacked.
All Classes -	320	914	887	2,113
Unvaccinated -	146	225	294	233
Proportion of Unvaccinated.	45·6 p.c.	24·5 p.c.	33·1 p.c.	11·0 p.c.
Attack Rate among Unvaccinated.	39·3 per cent.		55·7 per cent.	
Exclusive of those who had had Small-pox previously.	146	220	293	186
Ditto.	40·0 per cent.		61·1 per cent.	

SMALL-POX INCIDENCE ON VACCINATED AND UNVACCINATED.

—	LEICESTER.			DEWSBURY UNION.		
	Houses with Six Inmates or less.	Houses with more than Six Inmates.	All Houses.	Houses with Six Inmates or less.	Houses with more than Six Inmates.	All Houses.
Number of Houses - -	109	84	193	384	160	544
Inmates—total - - -	500	734	1,234	1,682	1,318	3,000
Vaccinated - - -	354	487	841	1,247	1,024	2,271
Do. per 1,000 - -	708	663	681	741	769	757
Unvaccinated - - -	140	231	371	314	213	527
Do. per 1,000 -	280	314	300	186	161	175
Attacked—total - - -	160	160	320	554	333	887
Incidence per 1,000 - -	320	218	259	329	252	295
Vaccinated - - -	95	75	170	344	200	544
Incidence per 1,000 - -	268	154	202	275	195	239
Unvaccinated - - -	63	83	146	180	114	294
Incidence per 1,000 - -	450	359	393	573	535	557

GROUP A.—*All attacked were vaccinated (or 'under' or 'alleged').*

Number of Houses - -	59	32	91	235	89	324
Inmates—total - - -	258	299	557	983	746	1,729
Vaccinated - - -	221	257	478	841	672	1,513
Do. per 1,000 - -	856	859	858	855	900	875
Unvaccinated - - -	36	39	75	66	38	104
Do. per 1,000 -	139	130	132	67	51	60
Attacked—total - - -	70	39	109	297	144	441
Incidence per 1,000 - -	271	130	195	302	193	255
Vaccinated - - -	70	39	109	273	136	409
Incidence per 1,000 - -	317	155	228	324	202	270
Unvaccinated -	—	—	—	—	—	—
Incidence per 1,000 - -	—	—	—	—	—	—

GROUP B.—*All attacked were unvaccinated.*

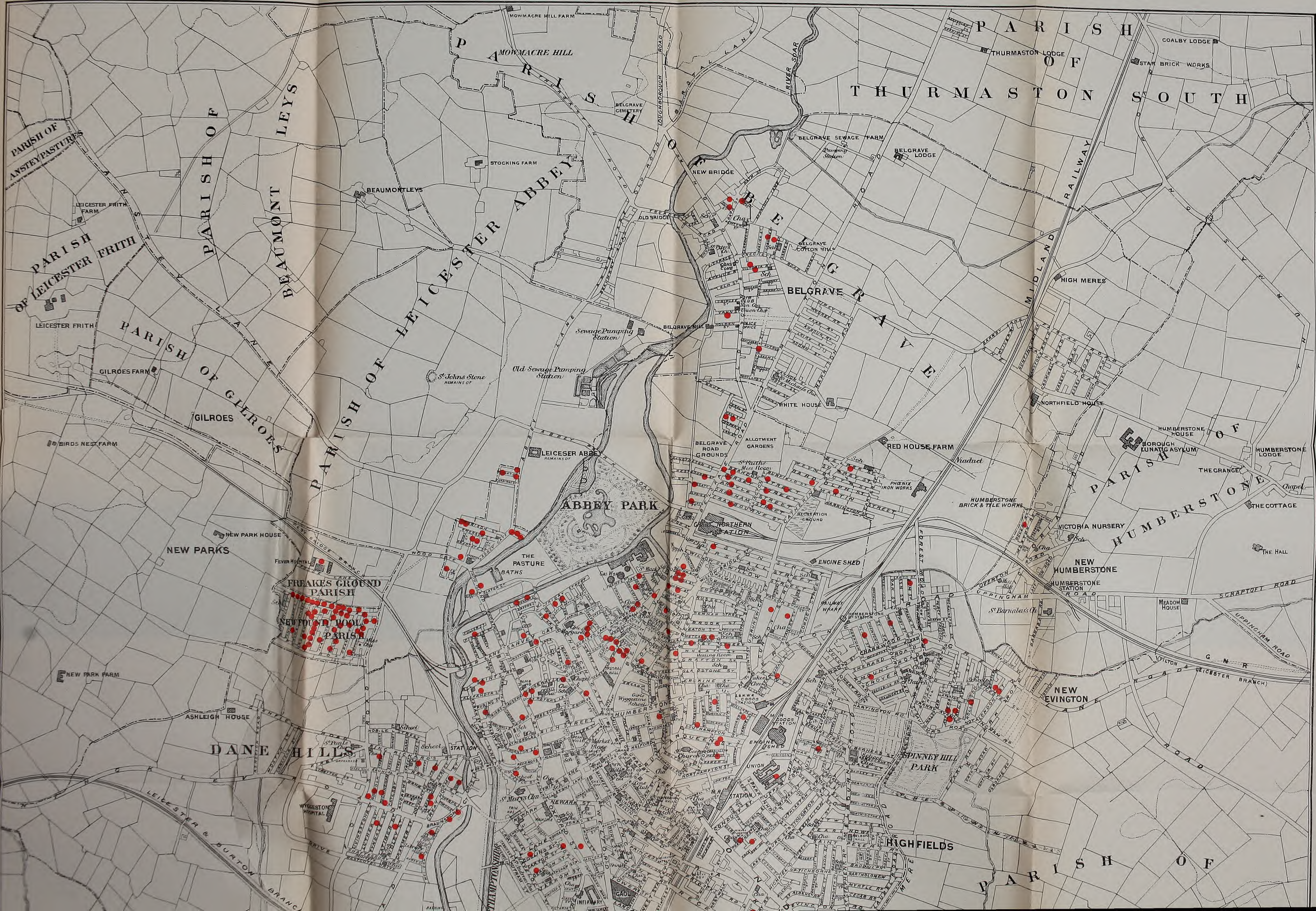
—	LEICESTER.			DEWSBURY UNION.		
	Houses with Six Inmates or less.	Houses with more than Six Inmates.	All Houses.	Houses with Six Inmates.	Houses with more than Six Inmates.	All Houses.
Number of Houses - -	30	31	61	99	34	133
Inmates—total - - -	141	262	403	459	272	731
Vaccinated - - -	76	123	199	258	163	421
Do. per 1,000 - -	539	469	493	562	599	575
Unvaccinated - - -	64	135	199	167	94	261
Do. per 1,000 -	454	515	493	363	345	357
Attacked—total - - -	37	49	86	116	52	168
Incidence per 1,000 - -	262	187	213	252	191	229
Vaccinated - - -	—	—	—	—	—	—
Incidence per 1,000 - -	—	—	—	—	—	—
Unvaccinated - - -	37	49	86	115	50	165
Incidence per 1,000 -	578	363	432	688	532	632

GROUP C.—*Attacked were vaccinated and unvaccinated.*

Number of Houses - -	20	21	41	50	37	87
Inmates—total - - -	101	173	274	240	300	540
Vaccinated - - -	57	107	164	148	189	337
Do. per 1,000 - -	564	618	598	616	630	624
Unvaccinated - - -	40	57	97	81	81	162
Do. per 1,000 -	396	330	354	337	270	300
Attacked—total - - -	53	72	125	141	137	278
Incidence per 1,000 - -	524	416	456	587	456	514
Vaccinated - - -	25	36	61	71	64	135
Incidence per 1,000 - -	438	336	372	480	338	400
Unvaccinated - - -	26	34	60	65	64	129
Incidence per 1,000 - -	650	596	618	802	790	796

SIDNEY COUPLAND, M.D.

MAP OF LEICESTER SHOWING HOUSES INVADED BY SMALL POX 1892-93.



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VACCINATION COMMISSION.

Presented by
Dr Seaton

APPENDIX VII.

TO THE

FINAL REPORT

OF THE

ROYAL COMMISSION ON VACCINATION.

REPORT TO THE COMMISSION

OF

Dr. SIDNEY COUPLAND,

ON THE

OUTBREAK OF SMALL-POX

IN THE

CITY OF GLOUCESTER

IN

1895—96.

Presented to both Houses of Parliament by Command of Her Majesty.

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Report on the Outbreak of Small-Pox at Gloucester, 1895-96.

INTRODUCTION.

Opening of inquiry.

At the request of the Chairman of the Royal Commission on Vaccination, I proceeded to Gloucester on March 30, 1896, to make inquiry into an epidemic of small-pox which was then in progress there. I found that the epidemic had already attained considerable proportions, that the hospital accommodation had proved to be inadequate, and that measures for quarantining infected households in their homes had been in great measure abandoned, owing to the strain on the resources of the sanitary department. The daily notifications which had been coming in since the beginning of February had reached the large numbers of from 20 to 30, the trade of the city was seriously impaired, the assizes had been transferred to Cheltenham, the hotels were deserted, and the professional classes were suffering greatly from the disinclination of the country gentry to be brought into contact with anyone from the city. The Sanitary Committee of the Town Council, sparing no time or trouble in its anxious and difficult task, was meeting every day, and measures to extend the hospital accommodation were being rapidly pushed forward, whilst a system of district nursing was in active operation for the care of the sick at their homes under the management of a local committee. My instructions were to ascertain primarily to what extent the epidemic had prevailed, what classes of the community had been attacked, and especially to determine the incidence and fatality of the disease as regards the ages of those attacked, and their condition as to vaccination, ascertaining also, as far as possible, the facts as to the rate of attacks in each class amongst those exposed to infection, and the type of the attack amongst the sufferers. It was clear that to perform this duty efficiently would entail a large expenditure of time, as it would necessitate the personal visitation of every infected house, from the beginning of the outbreak, as well as of those which were being daily added to the list. At my suggestion Mr. W. Irving, of the Middlesex Hospital, was requested to assist me in this work. He arrived on April 6th and remained at Gloucester until the beginning of May, my own duties in London compelling me to be absent for three weeks during this period; after that I was then enabled to make a longer stay in Gloucester, and subsequently visited it every week until the middle of July, when the epidemic subsided. To Mr. Irving was assigned the duty to ascertain particulars concerning the members of households infected by the disease, whilst I made a point of seeing for myself every one of those who was actually attacked, as well as all who had been attacked previously and had survived. I desire here to record my sense of the great assistance which was thus rendered to me by Mr. Irving, to whose records I am mainly indebted for the data dealing with the attack-rates.

Main objects of the inquiry.

Limitation of inquiry to the city.

It should be explained that this inquiry is confined to the cases which occurred within the boundaries of the city of Gloucester, so that it does not comprise the whole of the epidemic. Beyond the city boundary there is a fringe of houses, especially on the south and west, which are within the rural sanitary district. During the whole course of the outbreak cases occurred in this suburban area. Again, my inquiry closes on July 18th, 1896, after which date three more cases were notified within the city. The total number of cases dealt with in this report amount to 1,979, of whom 434 were fatal, a mortality of 21·9 per cent.

Outbreaks of 1873–75 and of 1896 contrasted.

The last occasion when an outbreak of small-pox occurred at Gloucester at all approaching the present in magnitude was in the years 1872–75, to which reference is made in an addendum to Part I. of this Report. That epidemic may be reckoned as commencing in May 1873, from which month to February 1875, deaths occurred every month, making a total of 151 for a period of 22 months.

In 1895–96 there have been 434 deaths from small-pox in a period of 13 months, or an average of 33 per month, as compared with one of seven per month in the earlier outbreak. Eliminating the 1895 cases, for the same reason as those occurring in 1872 and January 1873 are excluded, the contrast is made more striking, for we have on the one hand in 1896 a continuity of deaths from small-pox month by month, amounting to 430 within seven months, or 61 per month, as contrasted with the number of seven per month, extended over a period three times as long. Assuming (which is improbable) that the fatality rate was as high in 1873–75 as it was in 1896. there would have been at least 600 to 700 attacked within 22 months, say 30 per month, as compared with 1,974 attacks in seven months, or 280, *i.e.*, about nine times the former. Even were the type much milder in the earlier period, the difference would still be very striking.

Incidentally I may mention that the age-incidence (fatal cases only) differed in the two outbreaks. In 1873–75, the proportion of deaths below 1 year of age was 2·6 per cent. In 1895–96 it was 14·0 per cent. In 1873–75, at ages 1 to 10 years, the proportion of deaths was 31·1 per cent. In 1895–96 it was 50·4 per cent. In 1873–75, at ages 10 to 30 years, the proportion of deaths was 45·7 per cent. In 1895–96 it was 12·6 per cent. In 1873–75, at ages 30 and upwards, the proportion of deaths was 20·5 per cent. In 1895–96 it was 22·7 per cent.

Special features of present outbreak.

Indeed, the most remarkable feature about this outbreak, wherein it differs not only from the previous one in the same place, but from most other recent outbreaks of small-pox in other parts of the kingdom, has been the enormous rapidity with which it extended, and to this must be added the singular abruptness with which it ceased, and also the large number of children attacked. I was also impressed by the severe type of the disease, never having met, in the various inquiries on which I have been engaged during the past few years, with so large a proportion of malignant cases, or so high a mortality as characterised this epidemic.

The account given in this report of the rise and progress of this exceptional epidemic shows that for the first six months of its course it created but little anxiety. The cases which arose were traceably connected with one another; they were promptly removed to hospital on receipt of notification, and the system, now generally adopted, of "quarantining" the infected households was carried out with efficiency; but the sanitary staff and the hospital accommodation which sufficed for an outbreak of such limited dimensions could not be expected to cope with that which soon developed. Whilst from June to December there had been only 27 cases, in January there were as many as 52; but even this increase, although adding to anxiety, was not beyond the resources then at the disposal of the authorities. There had, too, been some fluctuations in the weekly returns, which gave hopes that the city might yet escape a severe visitation. However, in the middle of February, there was a striking exacerbation, the numbers notified rising in the week ending February 22 to 43, as against nine in the previous week, the total for the month being 145. This increase was due to the fact that within a few days of one another about 40 children attending the Widden Street Infants' School were attacked, and it will be seen from the particulars given in the report that there is good ground for believing that shortly afterwards other of the public elementary schools similarly served to disseminate the disease, until they were closed by the order of the sanitary authority. At any rate the large proportion of those attacked from the middle of February to the middle of March were young children. Strenuous efforts were made to cope with this unexpected influx of cases, the Stroud Road Hospital was extended (there had been already appointed to it a medical officer who had the sole charge of the patients, with the control nominally resting with the Medical Officer of Health) and at the beginning of March the "cholera" hospital at Hempstead, enlarged by the addition of a temporary block, was also thrown open for the reception of patients. This hospital was visited by another medical officer, and its nursing placed in the sole charge of ladies of the Clewer Sisterhood. Nevertheless the accommodation, now amounting to 200 beds, proved wholly inadequate; the hospitals became filled beyond their normal capacity, and the strain imposed upon the staff must have been very great. For the like reason, too, the administration of the hospital became disorganised, and defects inevitable to these conditions arose. The disease had now obtained a footing in the city which rendered it beyond control; the increasing numbers who remained in their homes served to keep up foci of contagion, which resulted in some quarters both in the south and west of the town being visited to a disproportionate extent, so that in some streets hardly a house escaped the disease. In March there were 604 fresh cases, in April 733, in May 283, and in June 122. It was somewhat remarkable to observe how suddenly the outbreak subsided, for in July (to the 18th) there were only 13 cases, and after that time, *i.e.*, after the period covered by this report, there were only three more cases, the last notification being on July 25.

Amongst the leading agencies which operated to cause this widespread epidemic, whereby it may be computed about 1 in 20 of the population have suffered, must be reckoned in the first place the invasion of the schools referred to. It is impossible to ignore the fact that these children must have been peculiarly susceptible to the contagion of small-pox, and no one at all conversant with the data of small-pox

Agencies which promoted the spread of the disease.

outbreaks can doubt that if these children had been vaccinated, so many (if, indeed, any) of them would have been attacked by the disease.*

It is equally certain that the mortality which ranged so high amongst these children, and which went far to prejudice the people with regard to hospital treatment, would have been almost wholly limited to adults. For my own part, and viewing the subject with as impartial a mind as I can, the conviction is forced upon me that Gloucester would not have suffered as it did had its child population been vaccinated. To my mind it seems a wilful shutting the eyes to this patent fact to assume, as has been done, that insanitary conditions were responsible for the outbreak in general, and for this school invasion in particular. Again, I must record my testimony to the manner in which the medical officer and nursing staff discharged their duties in respect to the care of the patients under their charge. Certainly I myself saw nothing at any of my visits which could be ascribed to negligence in treatment. That their task was no light one, far heavier indeed than ought to have been imposed upon them, is manifest from the fact that during the month of March the hospital was crowded with severe acute cases of young children requiring constant and careful attention. I mention this in justice to them, although it was no part of my mission to inquire into measures of treatment. It was most unfortunate that the decision to improve the administration of the hospital was not taken earlier; not that it would have been possible to have averted the mortality of the children, but that the work in the hospital might then have been better organised, and laxities unavoidable from a limited staff and ever rising influx of patients avoided. It is possible that the hope was entertained that by an attempt to isolate every case as it arose the epidemic might be checked, but this attempt only resulted in filling the hospital beyond its capacity and overburdening a too restricted staff. The hospital which, as regards its construction (at any rate the original block), was not inferior to many small-pox hospitals that I have seen, and superior to some, thus suffered greatly in credit, and this taken together with the enforced retention in their homes of the majority of the cases arising in March and April, led to the disinclination to enter it. Hence, when by the end of April the accommodation had been so extended as to have sufficed for the admission of every case, and when too the staff had been re-organised, and the whole arrangements improved, there were comparatively few cases out of those notified which were thus isolated. A further inducement to remain in their homes was given by the introduction into the city of a system of hydropathic treatment to which allusion is made in the body of this report. Thus, then, it is clear that the leading principle of dealing with an infectious disease, namely, the effective isolation of the attacked, was for the chief part of the outbreak in abeyance, and as also the quarantining of invaded households could no longer be controlled, but only advised, the facilities for the spread of the disease became unlimited. But whilst there can be little wonder that the epidemic attained such great proportions, it is certainly remarkable that it ceased so abruptly. The share taken in this by the universal adoption of re-vaccination is difficult to estimate, as it was impossible for me to obtain reliable data of successful re-vaccination. It would have been interesting to have ascertained whether the small-pox attack-rate in families was in any way relative to the numbers re-vaccinated, but this I have been unable to determine, owing to the fallacies involved in any such computation.

Comparison with Dewsbury (1891–92) and Leicester (1893–94) outbreaks.

I propose now to endeavour to make some comparison between the three outbreaks of small-pox which I have had to investigate for the Commission, namely, that in the Dewsbury Union in 1891–92, that in Leicester in 1893–94, and the present Gloucester epidemic. It must not, however, be considered that these places are comparable in other respects, either in population, industries, sanitary government, or general sanitation. One thing they had in common, and that was the relatively high proportion of children who had not been vaccinated, a proportion which was highest in Gloucester, nearly as considerable in Leicester, and markedly less in the Dewsbury Union.

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* This may seem a gratuitous assumption, but to myself it is amply justified by facts coming under my personal cognisance. Thus, to take some of the figures in recent outbreaks (up to the date of completion of my inquiries upon them), I find that of 3,546 attacks of small-pox, only 85, or 2·4 per cent., were in vaccinated children below the age of 10 years. In the Dewsbury Union (1891-92) the total attacks were 1,029, 44 vaccinated children under 10 years; in Manchester (1892–93) the figures are 865 and 11 respectively; in Oldham (1892–93), 107 and 3; in Leeds (1892-93), 200 and 4; in Halifax (1891–92), 330 and 4; in Bradford (1893), 658 and 17; in Leicester (1893–94), 357 and 2. Amongst these 85 cases, there was but one death, viz., at Dewsbury.

Weekly Incidence and Fatality.—In the Dewsbury Union (population, 163,000) in 1891–92, during a period of 70 weeks, there were 1,029 small-pox attacks, a weekly incidence of 14. In the borough of Leicester (population, 180,000) in 1893–94, during a period of 70 weeks there were 357 attacks, a weekly incidence of five attacks. In the city of Gloucester (population, 40,000) in 1895–96, during a period of 58 weeks, there were 1,979 attacks, a weekly incidence of 34 attacks. Again at Dewsbury there were 110 deaths (mortality, 10·7 per cent.), a weekly average of 1·5; at Leicester there were 21 deaths (mortality, 5·8 per cent.), a weekly average of 0·3; at Gloucester there were 434 deaths (mortality of 21·9 per cent.) a weekly average of 7·5.

In Dewsbury the deaths were to the attacks as 1 to 9, in Leicester as 1 to 17, in Gloucester as 1 to 4½.

These figures show that the outbreak in Gloucester was proportionately more extensive, and more fatal, than at the other places.

Age Incidence and Fatality.—At Dewsbury 224 of the attacked were under 10 years of age, in Leicester 109, in Gloucester 706, the number of deaths being respectively 57, 15, and 280. Therefore at Dewsbury the proportion of the whole number attacked who were under 10 years was 21·7 per cent., in Leicester 30·5, in Gloucester 35·6 per cent. And the fatality of this class was in Dewsbury 25·4 per cent.; in Leicester, 13·7 per cent.; in Gloucester, 39·6 per cent.

Above the age of 10 years there were at Dewsbury 805 attacks, 53 deaths; at Leicester, 248 attacks, 6 deaths; at Gloucester, 1,273 attacks, 154 deaths. The proportion to the whole number at this age was, therefore, at Dewsbury, 78·3 per cent., at Leicester, 69·5 per cent., at Gloucester, 64·4 per cent. Whilst the fatality at this age was, at Dewsbury, 6·5 per cent., at Leicester, 2·4 per cent., at Gloucester, 12·1 per cent.

A comparison of the age-incidence of the fatal cases of small-pox at Gloucester in the years 1872–75 with that of those in the epidemic of 1895–96 shows how in the former period the proportion of deaths below the age of 10 years was far below that amongst those above that age, whereas in the latter period these proportions were reversed, thus:—

In 1872–75,	under 10 years,	53	deaths, or	33	per cent.
,, 1895–96	,,	280	,,	64·5	,,
In 1872–75,	over 10 years,	107	,,	67	,,
,, 1895–96	,,	154	,,	35·5	,,

A closer analysis shows further that this divergence obtains mainly in the two age-periods of "1 to 10" and "10 to 30," for in 1872–75 the proportions of fatal cases were, under 1, 12; 1 to 10, 21; 10 to 30, 46; over 30, 21; and in 1895–96 these proportions were, under 1, 14; 1 to 10, 50; 10 to 30, 13; over 30, 23. It seems, then, highly probable that in the earlier outbreak the incidence of the disease upon children over the age of one year was far lower than in the present epidemic, where, indeed, this excessive child-incidence has been one of the most striking features.

Type of the Disease.—I have already mentioned incidentally the impression I gained almost from the outset of my inquiry as to the severity of the cases in this outbreak. This impression is verified by a statistical comparison of the types of the attacks here with those in the Dewsbury and Leicester outbreaks. Thus grouping together the "malignant" and "confluent" cases on the one hand, and the "coherent, discrete, and mild" on the other, it appears that in Dewsbury 26·5 per cent. of all attacks, or 273 cases, were of the former more severe types; in Leicester, 26·8 per cent., or 96 cases; in Gloucester, 43·1 per cent., or 854 cases (inclusive of three fatal "indeterminate" attacks in very young infants). Conversely, dealing with the lightest form of all, those cases termed in these reports as of "mild" type, it appears that in Dewsbury the percentage of the whole number attacked who fall into this category was 27·5, in Leicester, 35·5, and in Gloucester, 25·5.

Invaded Houses and Attack-rates.—The number of cases of small-pox per house was larger in Gloucester than in either Dewsbury or Leicester. Thus in Dewsbury there were 645 houses invaded, 1,021 persons in them suffered from small-pox, or 1·6 per house; in Leicester 193 houses, 320 persons attacked, or 1·6 per house; in Gloucester 1,098 houses invaded, 1,979 persons attacked, or 1·8 persons per house. Or, stated in another way, in Dewsbury 34 per cent. of all invaded houses had more than one case of small-pox in them, in Leicester 34·2 per cent., and in Gloucester 39·4 per cent. I shall return to these figures when speaking of hospital isolation.

Information was obtained at 544 invaded households in Dewsbury, 193 in Leicester, and 899 in Gloucester. The numbers of their inmates amount in all to 8,895 persons exposed to the chances of small-pox infection, of whom 2,924 were attacked, giving an attack-rate of 32·8 per cent. At Dewsbury among 3,000 exposed, 887 were attacked, or 29·5 per cent.; at Leicester, out of 1,234 exposed, 320 were attacked, or 25·9 per cent.; at Gloucester out of 4,861 exposed, 1,717 were attacked, or 35·3 per cent.

At Ages under 10 *years.*—At Dewsbury, of 729 exposed, 203 were attacked, or 27·8 per cent.; at Leicester, of 361 exposed, 102 were attacked, or 28·2 per cent.; at Gloucester, of 1,603 exposed, 641 were attacked, or 40·6 per cent.

At Ages over 10 *years.*—At Dewsbury, of 2,271 exposed, 684 were attacked, or 30·1 per cent.; at Leicester, of 873 exposed, 218 were attacked, or 24·9 per cent.; at Gloucester, 3,258 were exposed, 1,076 were attacked, or 33 per cent.

Vaccination and Small-Pox.—In each of these inquiries the greatest care was taken to determine the condition as to vaccination of those who were attacked with small-pox. It was found possible to range them under five categories, namely:—1. The vaccinated, those who were known to have been vaccinated in infancy, and those who bore marks of this. A sub-class included those who had undergone re-vaccina-

the beginning of the outbreak was about 30 beds, but by utilizing the other wards of the fever hospital this could be increased four-fold; and during the period several beds in these latter wards came to be occupied. At Dewsbury, where the whole of the infectious diseases hospital was also given up to the reception of small-pox patients, there were about 60 beds. At Batley, which at the outset was unprovided with an isolation hospital, there was provided temporary accommodation for about 40 patients, and later for some 30 more, the buildings being of an obviously makeshift character. At Gloucester the accommodation was at first limited to 48 beds, increased to 166 beds by the end of March, then to 316, the later additions being never utilised.

But even where the endeavour is made to isolate every case, a certain number fail to be so removed, as they do not come to the notice of the authorities at first, and there are sometimes refusals to go into hospital. Thus, at Leicester as many as 30 cases of small-pox were not removed to hospital, at Dewsbury five cases, whilst at Batley, where the accommodation did not at first exist and was later insufficient, as many as 302 out of a total of 545 were not removed. Finally, at Gloucester 1,267 out of 1,979 were not removed. The following table gives the numbers

remarked that the mortality of class 4 was in each series much [illegible] may be compared with
so that the combination of the two does to a certain extent diminish the fatality of the strictly unvaccinated class.

The Vaccinated Class.—Of those attacked in Dewsbury, 662 fall into this category, or 64·3 per cent of the whole number; in Leicester, 199 or 55·8 per cent; in Gloucester 1,211 or 61·2. The fatality amongst these was in Dewsbury 2·7 per cent. (18 deaths), in Leicester 1·0 per cent. (2 deaths), in Gloucester 9·8 per cent. (120 deaths).

The Unvaccinated Class.—In Dewsbury 367 attacked, or 35·7 per cent. of the whole number; in Leicester 158 or 44·3 per cent.; at Gloucester 768 or 38·8 per cent. The fatality in each was, at Dewsbury (92 deaths) 25·0 per cent., at Leicester (19 deaths) 12 per cent., at Gloucester (314 deaths) 40·8 per cent.

These figures are beyond cavil, and prove, not only a general concordance in the relative mortality of the vaccinated and unvaccinated, but also that the rate in the latter may range from 12 to 40 per cent; attaining, that is, a much higher figure than has been often claimed for small-pox in the days prior to the introduction of vaccination. They show also that in the Dewsbury epidemic the vaccinated fatality was twice as great as at Leicester, and at Gloucester nearly 10 times as great. Further, that the unvaccinated fatality was 2½ times as great at Dewsbury as at Leicester, and more than 3 times as great at Gloucester.

The following table gives the analysis of the above statistics for the several age-periods adopted in these reports :—

Age.	Dewsbury.*			Leicester.			Gloucester.			Mean Fatality.
	Cases.	Deaths.	Fatality.	Cases.	Deaths.	Fatality.	Cases.	Deaths.	Fatality.	
Vaccinated.			Per cent.			Per cent.			Per cent.	Per cent.
1 month and under - - -	—	—	—	—	—	—	—	—	—	—
1 month to 1 year - -	1	—	—	—	—	—	—	—	—	—
1 to 10 years - - - -	48	1	2·	2	—	—	26	1	3·8	2·6
10 to 30 years - - -	391	6	1·5	114	—	—	636	34	5·3	3·5
30 years and over - - -	216	11	5·	83	2	2·4	549	85	15·4	11·5
Unvaccinated.										
1 month and under - -	6	6	100·	—	—	—	22	21	95·4	96·3
1 month to 1 year - -	22	13	59·	6	2	33·3	63	40	63·5	60·4
1 to 10 years - - -	147	37	25·1	101	13	12·8	595	218	36·6	31·7
10 to 30 years - -	169	27	16·	47	3	6·4	65	22	33·8	18·5
30 years and over - -	22	9	41·	4	1	25·	23	13	56·5	46·9

* In 7 (6 vaccinated and one unvaccinated) age not ascertained.

In the households of which particulars were obtained the proportion who were *unvaccinated* amongst those who were *attacked* was, at Dewsbury 33·1 per cent. (294 out of 887), at Leicester 43·3 per cent. (145 out of 320), at Gloucester 35·1 per cent. (604 out of 1,717); whilst the proportion of the unvaccinated amongst those who were *not attacked* was at Dewsbury 11·0 per cent. (233 out of 2,113), at Leicester 24·4 per cent. (223 out of 914), and at Gloucester 6·7 per cent. (212 out of 3,144).

The *attack-rate* of the unvaccinated was therefore at Dewsbury 55·7 per cent., at Leicester 39·4 per cent., at Gloucester 74 per cent.

In age-periods these proportions and rates were as follow:

MEAN ATTACK-RATES.

Age.	Vaccinated.	Unvaccinated.	Both Classes.
	Per cent.	Per cent.	Per cent.
1 year and under - -	3·2	37·3	33·4
1 to 10 years - - -	9·2	45·4	34·4
10 to 30 years - -	30·6	57·4	33·7
30 years and over - - -	27·3	30·0	27·4
At all ages - - -	25·9	46·7	31·4

The various factors which may contribute to influence the attack-rate and mortality of a specific contagious disease are so numerous and complex that such a comparison as has been here instituted is of comparatively small value. The difference in locality, in the circumstances of the respective epidemics, the greater or less facilities for the communication of the disease among school children, factory hands, or other large sections of the community, the amount of hospital accommodation, the sanitary organisation, and also, it must be added, the character of the epidemic itself, which obviously varies from time to time, and from place to place these are a few of the conditions, which, quite apart from the question of the extent of vaccination, must operate more or less powerfully in determining the degree to which the members of a community invaded by small-pox suffer from the disease.

Nevertheless, some of these factors are more tangible than others, and although it may not be possible to attach to them their relative importance in the matter, yet all will admit that they do have some share, and as they are conditions which lend themselves to comparison it may be instructive to consider them. It will have been observed that in almost all respects Leicester suffered much less than either Dewsbury or Gloucester; the disease in that town hardly ever assumed the true proportions of an epidemic, its mortality scarcely affected the death-rate for the year, and the attack-rates, at every period of life, and amongst the vaccinated and unvaccinated alike, were below the mean of the three places taken together. Now, in one particular, without a doubt, Leicester does enjoy an advantage over either Dewsbury or Gloucester, and that is in respect to its sanitary government. It certainly cannot pride itself upon its hospital accommodation, but fortunately for the town that proved to be adequate for the comparatively small number of cases requiring to be admitted week by week. The same is indeed true of the borough of Dewsbury, but in some of the other districts of the Dewsbury Union, and notably in the borough of Batley, the outbreak of small-pox in 1891–92 attained proportions which rendered the hospital provision quite inadequate. In Gloucester too, although the hospital accommodation sufficed, so long as the epidemic was at a low level, it became insufficient when in the middle of February the disease spread with unwonted rapidity, owing to two large elementary public schools becoming infected. It need hardly be said that if by chance a similar accident had befallen Leicester, it too would have had its hospital accommodation soon rendered insufficient. There is no city in the kingdom which possesses anything approaching the isolation provision which could suffice for a weekly incidence of small-pox proportionate to the numbers notified in Gloucester during the weeks of March and April.

The amount of accommodation for small-pox patients in the Leicester Hospital at the beginning of the outbreak was about 30 beds, but by utilizing the other wards of the fever hospital this could be increased four-fold; and during the period several beds in these latter wards came to be occupied. At Dewsbury, where the whole of the infectious diseases hospital was also given up to the reception of small-pox patients, there were about 60 beds. At Batley, which at the outset was unprovided with an isolation hospital, there was provided temporary accommodation for about 40 patients, and later for some 30 more, the buildings being of an obviously makeshift character. At Gloucester the accommodation was at first limited to 48 beds, increased to 166 beds by the end of March, then to 316, the later additions being never utilised.

But even where the endeavour is made to isolate every case, a certain number fail to be so removed, as they do not come to the notice of the authorities at first, and there are sometimes refusals to go into hospital. Thus, at Leicester as many as 30 cases of small-pox were not removed to hospital, at Dewsbury five cases, whilst at Batley, where the accommodation did not at first exist and was later insufficient, as many as 302 out of a total of 545 were not removed. Finally, at Gloucester 1,267 out of 1,979 were not removed. The following table gives the numbers admitted into hospital in each place in every month, and it may be compared with the parallel table of the numbers of cases which remained at their homes :—

SMALL-POX.—MONTHLY INCIDENCE.

Month.	Leicester, 1893–94.	Dewsbury, 1891–92.	Batley, 1891–92.	Gloucester, 1895–96.
1st - - - -	1	—	1	1
2nd - - -	6	—	4	—
3rd - - - -	11	5	8	3
4th - - -	14	10	3	1
5th - - - -	37	8	5	3
6th - - -	54	5	2	7
7th - - - -	18	6	—	12
8th - - -	21	7	5	52
9th - - - -	44	2	76	145
10th - - -	54	23	176	604
11th - - - -	32	44	123	733
12th - - -	18	37	83	283
13th - - - -	16	44	35	122
14th - - -	7	31	16	13
15th - - - -	11	17	1	—
16th - - -	10	19	5	—
17th - - - -	3	7	2	—
	357	265	545	1,979

SMALL-POX CASES REMOVED TO HOSPITAL.

Month.	Leicester.	Dewsbury.	Batley.	Gloucester.
1st - - - -	1	—	1	1
2nd - - -	5	—	2	—
3rd - - - -	11	5	5	3
4th - - -	14	8	1	1
5th - - - -	35	8	—	2
6th - - -	49	5	—	7
7th - - - -	17	6	—	11
8th - - -	15	7	—	48
9th - - - -	38	2	20	121
10th - - -	52	22	41	208
11th - - - -	30	43	52	214
12th - - -	17	37	72	48
13th - - - -	15	44	26	39
14th - - -	7	30	15	9
15th - - - -	8	17	1	—
16th - - -	9	19	5	—
17th - - - -	3	7	2	—
	326	260	243	712

SMALL-POX CASES REMAINING AT HOME.

Month.	Leicester.	Dewsbury.	Batley.	Gloucester.
1st - - - -	—	—	—	—
2nd - - -	1	—	2	—
3rd - - - -	—	—	3	—
4th - - -	—	2	2	—
5th - - - -	2	—	5	1
6th - - -	5	—	2	—
7th - - - -	1	—	—	1
8th - - -	6	—	5	4
9th - - - -	6	—	56	24
10th - - -	2	1	135	396
11th - - - -	2	1	71	519
12th - - -	1	—	11	235
13th - - - -	1	—	9	83
14th - - -	—	1	1	4
15th - - - -	3	—	—	—
16th - - -	1	—	—	—
17th - - - -	—	—	—	—
	31	5	302	1,267

In a memorandum on the Gloucester outbreak which I prepared at the request of a member of the Commission, with the special object of contrasting the facts as to hospital isolation and sanitary government in Leicester and Gloucester, I pointed out that in certain respects, undoubtedly, the larger town was superior, as indeed might be expected, not only from its size but from the great attention which it has for many years paid to sanitation. Yet, in regard to the actual health of the two places, as judged by the prevalence of zymotics, the important elements of drainage and water supply, and also in that of provision for hospital isolation, there is not much to choose between them, having regard to their relative populations. It is, however, to my mind a very important matter, especially in times of epidemic, that the Medical Officer of Health should, as in Leicester, be in such a position as to be enabled to devote all his time to the sanitary service. It is at such times, especially, that the value of having an independent officer for this purpose can be best appreciated. It is neither fair nor just to expect that one whose time and attention are necessarily diverted by the calls of private practice can be able to do as much public work as will one not so engaged. With a Medical Officer of Health in responsible authority, and occupied solely with his official duties, it is not likely that the hospital would have become so overcrowded, and its management so chaotic; for he would have been free to take over its full charge, and would have seen that its organisation needed the improvement that was, in fact, subsequently effected. At Leicester, where the medical officer is independent of private practice, it is possible for him to keep himself in personal touch with all small-pox cases, to trace out their individual history, and to have medical charge of them in the hospital, which is wholly under his direction. But it must be admitted that even in Leicester, with its comparatively limited number of cases, the greater part of the time of its able and energetic medical officer was taken up by attention to the cases of small-pox, so that it is clear that if Leicester had been visited with an epidemic of similar severity as was Gloucester, it too would have been overwhelmed by the magnitude of the work required to cope with the outbreak. The same applies to the sanitary service of the two places. This is admittedly superior in Leicester, and during the small-pox outbreak there it was possible for every infected house to be visited by an inspector once a day for the fortnight of "quarantine," a duty which also was performed in Gloucester until, with the great multiplication of these infected centres, it became quite impossible to carry it on. Would not the same inability have occurred at Leicester had its epidemic been of similar proportions? For if we take as approximate proportions the population of the two places to be as 4 to 1 (*i.e.*, Leicester, 180,000; Gloucester, 40,000), the numbers of the attacked in the 10th, 11th, and 12th months would have been at Leicester, 2,416, 2,932, and 1,132 respectively, instead of 54, 32, and 18; whilst further, if there had been at Leicester a similarly proportionate number removed to hospital as there were at Gloucester, these admissions would for the 10th and 11th months have had to rise to 832 and 856, figures very far beyond the accommodation available, which, too, would have needed a staff of nurses and medical attendants, as well as buildings that would have taxed the resources of Leicester to an even greater extent than happened at Gloucester.

I have thought it well to draw this parallel, because, in my opinion, it is easy to exaggerate the part played in the control of epidemics by even the best sanitary organisation. In every epidemic cases occur unknown to the authorities until they have widened the area of infection by communicating the disease to others, and when, as happened at Gloucester, this widening of the area was due to the simultaneous infection of school-children, no sanitary authority could control its spread. I believe I am right in saying that during the Leicester outbreak the one thing that gave rise to most anxiety on the part of the authorities was lest the disease should be imported into the public elementary schools. Had this happened, and it was accident rather than foresight that averted its happening, there is no reason at all for doubting that the larger, better organised, and better equipped community might not have suffered to a parallel extent. I believe that I pointed out this in the memorandum referred to, and I think it is a consideration which ought not to be lost sight of in any endeavour to contrast the experiences of Leicester in 1893–94 with those of Gloucester in 1895–96.

Conclusions derived from this inquiry.

To sum up the main conclusions which seem to flow from this investigation:—

1. The epidemic of small-pox, which during 1895 had been comparatively slight and mild, assumed serious proportions in the months of February to April 1896, not only in the numbers who were attacked, but in the high rate of fatality, and the undue proportion of cases of confluent and malignant type.

2. The main reason for the rapid extension of the disease was the almost simultaneous invasion of many homes through children who were infected whilst attending certain of the public elementary schools.

3. Another reason for the spread is to be found in the inadequacy of the provision for hospital isolation, and the enforced abandonment of systematic "quarantine" inspection, both conditions being due to the enormously rapid increase of the attacked, and of the houses invaded by small-pox.

4. The outbreak might probably have subsided earlier had it not been for the fact that reluctance to enter the hospital became so general. Amongst the reasons which conduced to these refusals to avail themselves of this isolation the most potent seems to have been the high rate of fatality amongst the hospital patients in the weeks that the building was most crowded. This disproportionate fatality is to be ascribed to the equally disproportionate severity of the type of cases admitted into the hospital during this period.

5. A further reason for the spread and continuance of the epidemic may be found in the position of the hospital (many houses having been built in its vicinity of late years), and the lack of control in its administration. On the other hand the conditions obtaining in the streets and dwellings most affected were of themselves such as to sufficiently account for the dissemination of the disease by direct contagion.

6. There is no sufficient evidence to support the contention that defective drainage or other insanitary condition was responsible for the development of the disease and for its disproportionate incidence in the South Hamlet. But the conditions which favour contagion were abundantly present, especially the retention of a large proportion of cases within their homes, and in may instances, also, the impossibility of isolating the attacked within the house.

7. A feature which, as well as the exceptional fatality and severity, characterised this outbreak was the excessively disproportionate incidence of the disease upon young children. Of the whole number attacked (1,979) there were 706 under 10 years, or 35·7 per cent. Of the fatal cases (434) there were, in this age-period, 280 or 64·5 per cent.

8. Of these 706 children, only 26 were "vaccinated" (including one vaccinated three weeks before attack, and one who presented no marks of an alleged primary vaccination in infancy), whilst of the remainder 80 were "undergoing" vaccination when attacked, the vaccination having been performed within 14 days of the onset.

9. This proportion of vaccinated and unvaccinated amongst the *attacked*, 26 to 680, or, for every 100, vaccinated 4 (nearly), unvaccinated 96, may be compared with the proportions of the same ages and classes amongst those *exposed* to infection. According to the data collected from 899 households there were, under 10 years of age, 1,603, of whom 272 were vaccinated 1,331 unvaccinated, or, for every 100, 17 vaccinated to 83 unvaccinated.

10. There is no escape from the conclusion that the heightened mortality and severity of the epidemic were greatly due to so large a proportion of *unvaccinated children* being attacked, for :—

(*a.*) The case-mortality under 10 years of age was 39·6 per cent., amongst the vaccinated 3·9 per cent., amongst the unvaccinated 41 per cent. Had the fatality remained in each class the same as obtained for the whole number at this age, there should have been 11 vaccinated deaths, and 269 unvaccinated. Or had the rate been that which actually obtained amongst the "vaccinated" there should have been only 26 unvaccinated deaths instead of 279, whilst *per contra*, had the unvaccinated rate been general, the vaccinated deaths should have been 11.

(*b.*) The disparity is quite as marked when the type of the attack is contrasted. For of 507 cases of *severe* attacks (malignant, confluent, indeterminate) there actually occurred only 3 amongst the vaccinated. Had the proportion obtaining in the whole number been here maintained (4 to 96) there should have been nearly 21 vaccinated attacks. Or if we take the *mild* attacks only, there were 48 at these ages, of which 17 were amongst the 26 vaccinated subjects. There ought to have been only 2 had the ratio between vaccinated and unvaccinated obtained here as it did for the whole number attacked.

Again, at the "vaccinated rate" (11·5 per cent.) the severe cases amongst the unvaccinated should not have exceeded 82, whilst at the "vaccinated rate" also (65·4 per cent.) the unvaccinated should have yielded 444 mild cases instead of 31.

Similarly, if the "unvaccinated rates" had obtained, there should have been 19 instead of 3 severe attacks amongst the 26 vaccinated subjects and only 1 mild case instead of 17.

Indeed in whatever way the question is regarded it is beyond dispute that small-pox in the vaccinated at this period of life is comparatively infrequent (in Gloucester the attack-rate was 8·8 as compared with 30·2 in the same class at ages 10 years and upwards), and that in those who are attacked the disease is mostly of the mildest form, whereas amongst the unvaccinated at this age the majority of attacks are severe.

11. From which considerations it follows that in the epidemic here under notice the severity of the disease, its high mortality, and its propagation were influenced and promoted by the unduly large proportion of unvaccinated children who were exposed to infection and who were infected.

12. As regards small-pox in the "re-vaccinated" it will be observed that in no fewer than 190 instances were individuals attacked who were said to have been vaccinated more than once. The evidence of re-vaccination, however, is seldom as definite as is that afforded by a successful primary vaccination, whilst many persons acknowledge that their re-vaccination "did not take." This negative result of the operation was admitted in 62, yet it was not possible to say of the remainder that they had all been successfully re-vaccinated. Again in 86 individuals the re-vaccina-

tion had been done within so short a period of the onset of small-pox as hardly to be regarded as of any influence. In point of fact there were only seven persons, all of whom had discrete or mild attacks (including one "inoculated,") whose re-vaccination had been effected within from three months to 14 days of the attacks. In the remaining 35 the re-vaccination in several dated back for many years.

13. Lastly, it is not unlikely that had Gloucester been better equipped for the emergency, had its sanitary organisation been more on a level with what should be the rule in cities of its importance, the epidemic might not have attained such proportions. Nevertheless it must in fairness be remembered that the hospital accommodation for infectious diseases at the time of this outbreak was not actually inferior to that recognised as normally adequate for a place of its size (one bed per 1,000 of population), although I am far from thinking that in this matter sufficient provision is generally made. A permanent building, with a resident medical and nursing staff, ought to exist in every sanitary area. In this case the exceptionally sudden outburst of the disease, which spread with the violence of measles among the young, rendered nugatory all the efforts of the authorities to cope with it, and these very efforts to attempt general isolation, when the means for such a measure became inadequate, led unfortunately to conditions that tended to neutralise the effect of the extended provision which eventually was made.

In conclusion, I desire to express my thanks for the assistance rendered me in this prolonged inquiry by the authorities and officers concerned, to Mr. A. Woodward, the chairman of the sanitary committee, Dr. Campbell, the medical officer of health, Mr. Read, the city surveyor, Mr. G. S. Blakeway, the town clerk, Mr. Mayer, the clerk to the board of guardians, Mr. Pitt and Dr. Brooke of the Small-Pox Hospital, Mr. Ohner, the sanitary officer, and to all who furnished me with information which has enabled me to compile the following report.

SIDNEY COUPLAND.

London, December 1896.

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§ 1. General Description of Gloucester.

The City of Gloucester.

The present boundaries of the City of Gloucester were fixed in the year 1875, when a considerable extension took place, many small local authorities being merged into one. Within the last few years many new houses have been erected just beyond the urban limits, particularly to the south and east. This suburban area is under the county administration, but as it practically merges into the city, with which it is continuous, the time seems to be approaching when, for administrative purposes, it may become necessary still further to extend the city limits. The present inquiry into the outbreak of small-pox deals only with the cases notified to the urban authority, and takes no count of those arising in houses beyond its area; but it must be understood that several cases occurred in these outlying portions of the district, which were notified to the Rural Sanitary Authority. In all that follows reference is limited to the urban district only.

Registration districts.

The urban district is divided into four registration sub-districts, viz., Kingsholm, St. Nicholas, South Hamlet, and St. John Baptist. These divisions are of varying extent. By far the largest is the South Hamlet, which includes about one-half the total area, and extends to the north beyond a line drawn from east to west across the centre of the city. The respective acreage is—

I.—Kingsholm	265 acres.
II.—St. Nicholas	352 ,,
III.—South Hamlet	700 ,,
IV.—St. John Baptist	126 ,,

Kingsholm.

The *Kingsholm* sub-district occupies the north-east portion of the city, and is comparatively slightly built over; the Wotton County Lunatic Asylum, the Union Workhouse, the stations of the Great Western and Midland Railways and the Cattle Market are all within this area, which is bounded on the east by the London Road and on the south by the Twyver Brook.

St. Nicholas.

The *St. Nicholas* sub-district is an irregular area embracing the thinly peopled northern part of the city, containing large detached residences and gardens, and two large open spaces; it extends also to the north-west extremity of the city beyond the River Severn, and comprises, therefore, the cathedral and some of the most densely crowded courts and alleys that lie between Westgate Street and the river on the one side, and the cathedral precincts on the other.

South Hamlet.

The *South Hamlet* is bounded on the east by the main line of the Great Western Railway, and is traversed by the Midland Railway, which joins on to the former at the south-east angle of the district. As stated, this district occupies more than one-half of the city, contains a large open space—the Park—its main roads being Barton

Street running eastwards, the Bristol Road southwards, and the Stroud Road south-eastwards. The Gloucester and Berkeley Canal partly bounds it on the west, and partly crosses the westernmost angle of the district (Llanthony Priory).

St. John Baptist.

The *St. John Baptist* sub-district, smallest in area, but densest in population, contains the heart of the city. Irregular in area, it extends to the north, enclosing some of the older, crowded streets which lie between the London Road on the east and Kingsholm Road on the west, whilst it embraces many of the smaller and older streets which cluster around the Cross (the highest point of the city) and the four main roads—Northgate, Westgate, Southgate, and Eastgate—that diverge from this spot.

§ 2. WATER SUPPLY AND DRAINAGE.

For the past 20 years the questions of water supply and drainage have been constantly before the minds of the people of Gloucester. The reason of this is simple. In the year 1875 the boundaries of the city were extended considerably, and the added districts were notoriously deficient in proper drainage, whilst they took their water from surface-wells in the gravel beds which underlie the greater portion of that district, the water of these wells being proved by analysis to be contaminated with organic impurity, probably derived from the leakage of defective drains.

Water supply and drainage of the old city;

In the first Annual Report to the Urban Sanitary Authority (1875) the then medical officer of health (Mr. J. P. Wilton) draws a sharp contrast in these two respects between the old city and the added districts. The former, he states, is provided with an "elaborate system of drainage of a very superior character," the "water-supply" he characterises as "good," but capable of improvement in regard to the occasional intermittence, and to its filtration. Apparently but few wells were in use then in this old part of the city; on the other hand he says that one "could hardly imagine a worse state of things as to drainage and water supply" than that which existed in the newly added districts. He had made frequent examinations of the water used throughout the whole of the district east and south-east of the town, and had only found one sample that was fit for consumption; and he describes the water as being drawn from wells sunk in the gravel bed that underlay the whole district, from near the Cemetery on the east to Brunswick Square on the west, embracing the area of Falkener, Regent, and Howard Streets. Drainage was mostly into cesspools or by brick culverts, conducting the sewage into brooks, part of which were culverted, but when open were most offensive. The Twyver brook, the chief of the three watercourses (*see* Plate I.), which ran into the Severn from the east, received much of this drainage, and was described as a "constant nuisance"; the Sudbrook also was used as a partly open drain.

of the added area;

Sewerage extension.

The city authorities in taking over the duties of the small local boards, were thus at once confronted with a condition of things that was injurious to health, and demanded immediate attention. Works were at once commenced to extend the city main sewers, and gradually to connect the old drains with the new, and at the same time to do away with wells and connect houses with the corporation water mains. The progress of this work year by year can be traced in the medical officer's annual reports, and although it has even now not been entirely effected, yet it is clear that no effort has been spared to complete it. Three deficiencies have been constantly alluded to in these reports, namely, the inadequate ventilation of the sewers, their imperfect flushing, and the restricted water supply; and to a large extent these have been remedied by the erection of sewer ventilating shafts, the provision of flushing boxes to the w.c's of houses that did not previously possess them, the connexion of every house with the city sewer system, and of an increasing number with the city water supply, rendering an extension of this imperatively necessary. By the year 1885 (I gather from the reports) the connexions with the city sewers were completed, but no fewer than 2,528 houses out of a total of 7,696 were still unprovided with flushing tanks. By the year 1894 (the date of the last published report) it is stated that 8,597 out of a total of 8,893 houses had these flushing boxes, whilst the number of ventilating shafts, which was 336 in 1885, had increased to 1,080. It could not but happen that these alterations should have materially reduced the nuisance arising from the escape of sewer gas from man-holes; although this still happens occasionally it is very much less than formerly, and not worse than in many a town drained in a similar manner. Allusion is made to the escape of sewer gas creating a nuisance in the reports of 1877, 1882, and 1883; it was attributed to the lack of proper flushing, and the accumulation of sewage in the old drains. The latter cause has practically ceased to exist, and the former has been considerably amended, although some houses are still without means of proper flushing. The erection of ventilating shafts has also materially tended to convert the street man-holes from outlets to inlets. In 1892 a house-to-house inspection was made with a view of remedying defects in lax drainage. Many such defects were discovered and set right. In that year there were still 387 houses using well water (there had been 1,141 in 1885), but by the close of 1894 this number was reduced to 141.

City water supply.

The sources of the city water supply, at the beginning of the present year, were reservoirs situated on Robins Wood Hill, which is an isolated offshot of the Cotswold range to the south-east of the city, just beyond the boundary, and at Witcombe, on the Cotswolds, 5 miles from the city. The former was the original supply; the works at Witcombe being commenced in 1855 and extended in 1868. About 180 houses (chiefly in Alma Place, off the Bristol Road), are supplied with water from a small reservoir (Lysons') situated at Hempsted to the south-west of the city. The inadequacy of the total supply was long ago pointed out in the medical officer's reports, which showed that in seasons of drought it would be practically exhausted. I understand that such contingencies have occasionally arisen, rendering a recourse to the use of the waters of the Severn necessary. This undesirable remedy will, however, not again be required. In 1894 powers were obtained to increase the sources of supply, and a site at Newent nine miles to N.W. was secured. The works were completed this year, and the new water supply opened on July 1st, just as the older reservoirs were becoming very empty owing to the prolonged dry season.

I am indebted to Mr. Read, the city surveyor, for the following particulars of the sewerage system in Gloucester. He also kindly furnished me with two maps showing the watercourses and main sewer outfalls, from which the annexed sketch plans have been prepared.

General plan of city.

The city, which lies on the left bank of the Severn, at a point where the river makes an acute bend to the east, is situated on low ground. The highest point in the city is the Cross, whence proceed, in each direction, Westgate Street, leading down to the river, Northgate Street, from which branches off Worcester Street, passing on to Kingsholm to the north-west, whilst the main street continues as the London Road on the north; Eastgate Street, continued into Barton Street, leading eastwards, and Southgate Street passing through Littleworth and continued to the south in the Bristol Road, the Stroud Road passing from the junction of these roads towards the east. The Gloucester and Berkeley Canal and Docks, starting from the centre of the city between Westgate Street, Southgate Street, and the river, run directly south, almost parallel to the Bristol Road. On the east the city is bounded by the main line of the Great Western Railway, and the area included between this and the Midland Railway, which runs through the city, crossing Barton and other streets by level crossings, comprises the Tredworth district. Beyond this eastern boundary lies the cemetery, at the foot of Robins Wood Hill. Most of the new additions to the city and suburbs are in this eastern and southern portion, and it is in these directions, especially the latter, that a further extension of the limits of the urban authority is to be desired. At the present time the population of the extra or sub-urban area is estimated at about 1,700. It is under the control of the rural district.

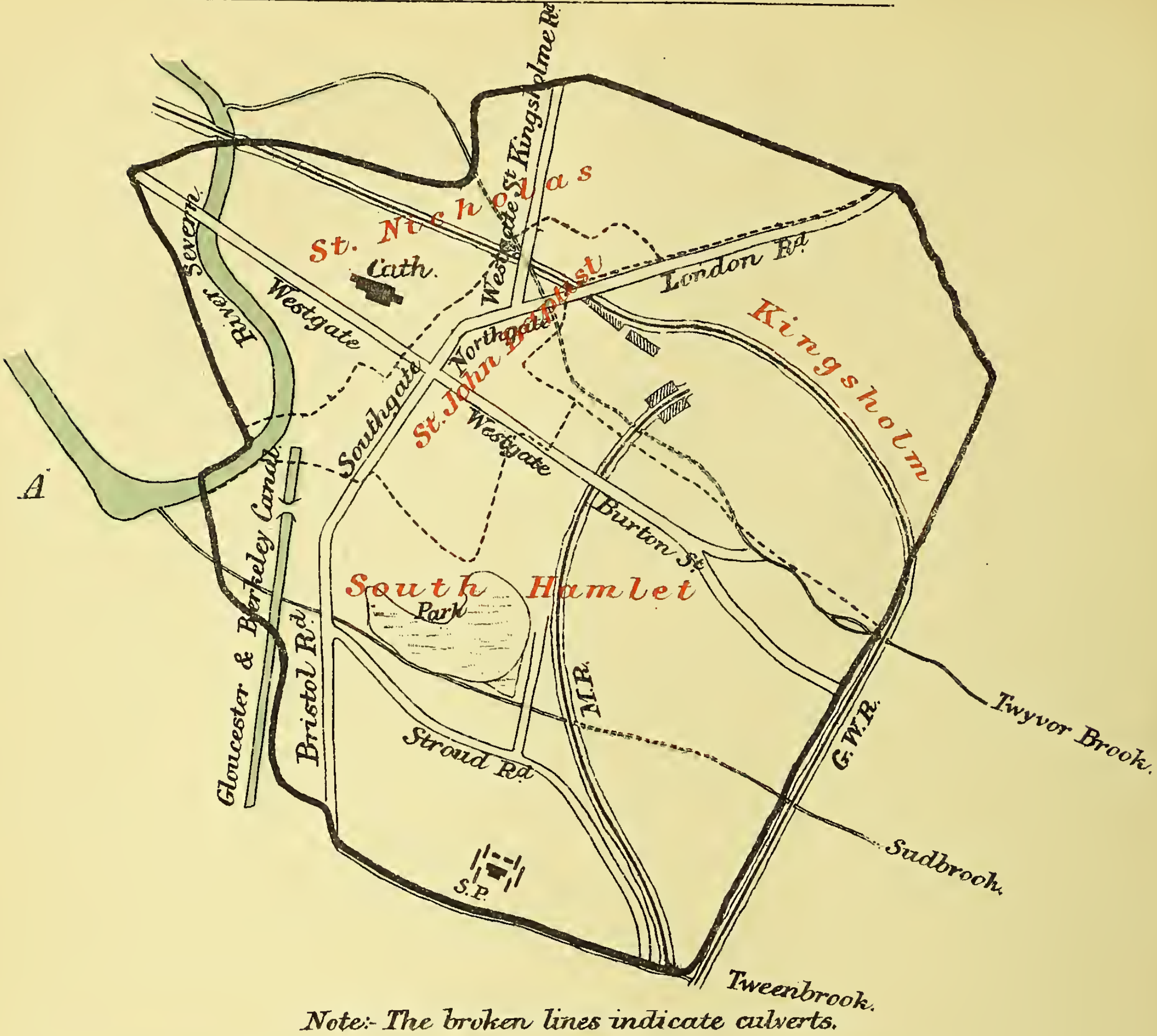
The Twyver.

The Sudbrook.

The Tweenbrook.

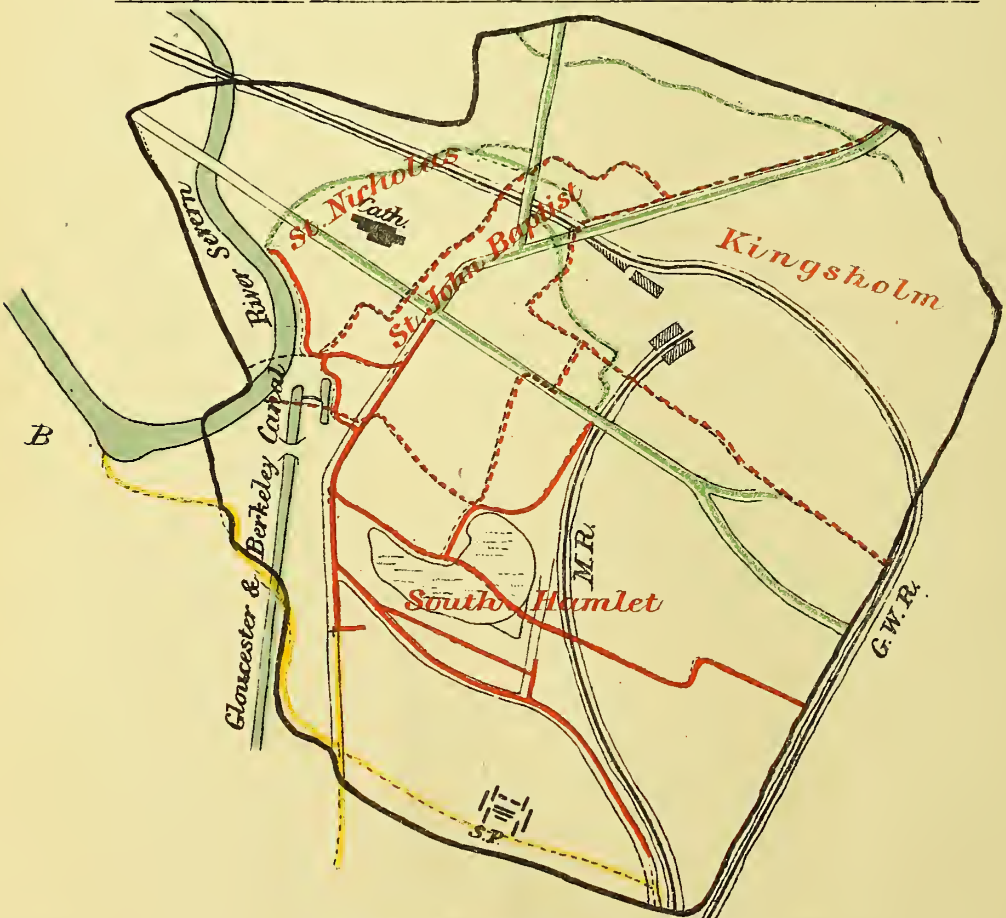
Three watercourses traverse the city from east to west (Plate I.), but only one of them is of any size. This is the Twyver Brook, the northernmost of the three, which arises in the Cotswolds, and enters the city north of Barton Street; open for certain distances, it is carried in culverts through part of the town, crossing the Market Place and Northgate Street, and emerging in fields beyond the northern boundary of the city to join the Severn. The central watercourse is the Sudbrook, also arising in the Cotswolds, and passing by Matson Place and Melbourne Street, where it is carried in culverts until the Midland Railway is crossed, when it is again open, bounding the Spa Fields on the south, then crossing Southgate Street, to terminate in the canal. An additional culvert utilised in flood time, is carried under the canal by a syphon (9-inch pipe) to open into a watercourse which ends in the river above the weir. The southern boundary of the city is formed by the small Tweenbrook, which takes its rise in Robins Wood Hill, and is carried by a pipe into the sewer in the Bristol Road; originally this brook passed along the Bristol Road to a culvert, and thence by the side of the canal for a distance of 420 yards, when it was conducted across the

GLOUCESTER. PLAN SHOWING WATER-COURSES.



Note:- The broken lines indicate culverts.

GLOUCESTER. SKETCH PLAN OF MAIN SEWER OUTFALLS.



Northern Outfall Sewer coloured green 🟩
Central " " " red. 🟥
Southern " " " yellow. 🟨

To face p. 17.

Wyman & Sons, Ltd, Lith. 7019.3.97.

canal by a syphon to meet the Sudbrook on its way to the river, but in 1884, when the south sewer outfall was laid down, the right limb of the Tweenbrook (it was originally bifurcate) was taken into the Severn, and the syphon utilised for it.

Sewage outfalls.

The older portion of the city was sewered in 1852, and on the extension of the boundary in 1875 the sewers were extended by Mr. James Massey, C.E., to cover the additional area. There are three main lines of sewerage, the northern, central, and southern; the two former run from the Cross, and discharge side by side in the river Severn, south of Westgate Street. The outlets are egg-shaped, 4 ft. 6 in. by 3 ft., and at each there is a fall of 1 in 480.

"The *northern* outfall sewer (coloured green in Plate I.) commences at the south-east boundary of the city against the Great Western Railway, and runs in a north-westerly direction along Lower Barton Street to the Midland Railway main line level crossing. From thence it turns along Station Road, Cambridge Street, Prince Street, along another portion of Station Road, across the Cattle Market to the 'Spread Eagle,' where it picks up the London Road and Northgate Street branches; through the 'Black Dog' yard to Worcester Street, where it picks up the Kingsholm Road branch; along St. Catherine's Street and Priory Road to Lower Westgate Street, discharging into the river at the City Quay. The *central* outfall sewer (coloured red in Plate I.), also lying against the Great Western Railway on the south-east boundary of the city, running in a westerly direction along Adelaide Street, Moor Street, High Street, Howard Street, Midland Road, across the Midland Railway main line to Park End Road; across the Park to Spa Road, along Spa Road to Southgate Street, when it picks up the Stroud Road branch and a portion of the Bristol Road sewer from Philip Street; then a short distance along Southgate Street to the dock gates opposite the Albion Hotel, skirting round the Victoria Dock into Commercial Road, down which it runs to the quay, and along the quay to where it turns into the river alongside the northern outfall. The *southern* outfall, or the south end drainage, constructed in 1884, commences at the southern boundary of the city in the Stroud Road, runs in a westerly direction down Linden Road to the Bristol Road, when it picks up the remainder of the Bristol Road sewer from Philip Street inside the city, and also a portion from outside the city; it then runs through Messrs. Barkworth and Spalding's and Messrs. Ashbee and Sons' timber yards to the canal bank, where it enters an old culvert—2 ft. 6 in. diameter—belonging to the Canal Company, and crosses under the canal by a syphon also belonging to the Canal Company; from thence it traverses open fields and osier beds for a distance of 650 yards, and discharges into the river at low-water mark below the Llanthony Weir.

"The northern outfall sewer is 3,433 yards in length, and has a fall of 57·60 feet in the distance, or an average gradient of 1 in 178. It commences with a 9-inch pipe by Chequer's Bridge, and discharges into the river by a brick culvert, 4 feet 6 inches by 3 feet.

"The central outfall sewer is 3,000 yards in length, and has a fall of 43 feet in that distance, or an average gradient of 1 in 209; commencing in Adelaide Street with a 9-inch pipe, and discharging into the river by a brick culvert, 4 feet 6 inches by 3 feet.

"The southern outfall sewer is 2,766 yards in length, and has a fall of 47·26 feet, or an average gradient of 1 in 175; commencing with a 9-inch pipe in the Stroud Road, discharging into the river below the weir by a brick culvert, 3 feet by 2 feet 3 inches."

It will be seen from Plate I. that the three lines of sewerage practically follow the valley lines of the three natural watercourses; the Twyver, the Sudbrook, and the Tweenbrook, which originally traversed the city.

The Tweenbrook, prior to 1884, as stated, ran through a culvert along the canal bank, and through a syphon under the canal, discharging above the weir; the brook was stagnant and foul (the Still Ditch it was termed), the inlet and outlet of the syphon being at the same level. Tho syphon was adapted to the south end sewer constructed in that year to remedy this state of things. The syphon was then thoroughly cleaned out and the outlet cut down 3 feet 6 inches below the inlet, and the present outfall sewer laid in a nearly direct line to below the weir, thus gaining a fall of 7 feet from the outlet of the syphon to low-water mark of the river. " Another great advantage from the adoption of this scheme was that it enabled " the Bristol Road sewer to be divided, and made it drain in both directions from

"Philip Street, whereas previously, in 1875, it was attempted to make it drain all in "one direction from Alma Place to the central sewer in Southgate Street."

"Previous to 1886, when the New Quay wall was built, the northern and central sewers had only one outlet, 4 feet 6 inches by 3 feet, this being again reduced below low water to an iron pipe 30 inches diameter, and the opportunity was taken when rebuilding the wall to give each of the sewers a separate outlet (4 feet 6 inches by 3 feet)."

Small-pox and drainage.

It has seemed necessary to enter into these details respecting the drainage of Gloucester because of the opinion, freely expressed, that the epidemic of small-pox could be ascribed to defective sanitation arising from drainage imperfections. This has been brought under the notice of the Commission by Lieut.-General Phelps, who also addressed letters to the public press in the same sense, his main contention being that the comparatively bad drainage of South Gloucester, as compared with that of North Gloucester, accounted for the incidence of the disease being mainly in the southern half of the city. These and other statements impugning the drainage, and the alleged effect of the high tide causing the sewers to be blocked, are replied to by the city surveyor in a letter dated 27th March 1896. I have, moreover, been convinced of the practical absence of any such reflux into the main sewers, and even as regards the syphon of the south end sewer it is hydrostatically impossible for such a reversal of the current to take place except under the most unusual combination of circumstances, viz., an exceptionally high tide, the flood season, and a wind against the stream. The highest flood in the last 18 years reached 14 feet above low-water mark, and the Waggon Works (between the canal and Bristol Road) were under water: but even then the syphon was 6 inches under water. From my own observation I cannot say that I observed any constant malodorous emanations in the streets of the South Hamlet, which in the course of my inquiries I must have traversed very many times; but I did on two or three occasions receive complaints from the inhabitants. The exceptionally dry season, and inadequate local flushing, may well explain such intermittent nuisance, but that there has been during the period of the epidemic any general or constant escape of sewer gas throughout the infected neighbourhood, such as would arise from blocking of the main sewers, is certainly not the fact. Among the infectious diseases, the dissemination of which may with fair certainty be accurately ascribed to sewer gas emanations, small-pox has not yet found a place. It would be presumption to affirm that its contagion could not be carried through drains, but far simpler explanations of its spread are ready to hand. Of diseases which may be termed "pythogenic," there has been a singular absence during the prevalence of small-pox, and, indeed, a very notable improvement in their amount within the city *pari passu* with the extension and improvement of the drainage. The idea that sewer gas has had to do with this outbreak* has in all probability arisen from the fact that for many years, owing to the old drainage defects, the extended South Hamlet gained unenviable notoriety, and I am sure that Mr. Read is correct in saying that "the "drains of the city will compare favourably with those of any other city or town" (*see* his letter of 27th March). He also informed me that "previous to 1875, the "districts which were then added to the city were in charge of three local boards "who had an elaborate system of shallow brick culverts, varying from 18 inches "to 2 feet 6 inches diameter, laid along the old ditches and draining into the Twyver "and the Sudbrook respectively. Most of them were laid in the back gardens of the "houses, and in laying the new sewerage system, in 1875, these had to be temporarily "connected wherever they were crossed. The consequence was that the street man-"holes and ventilators introduced on the new system became outlets for the stinks

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* "Gloucester empties its raw sewage into the River Severn, on which it is built. This being a tidal river washes the sewage backwards and forwards past the city. The water supply is short in quantity, and is occasionally eked out by pumping water out of the sewage-polluted river into the mains. The land on which South Gloucester is built is flat, and the gradients of the sewers inadequate. Solidified sewage lies in them 18 inches and 2 feet deep, and the trickle of water over it is insufficient to flush them, but enough to keep up putrefactive fermentation. The escape of the sewage gas resulting from this horrible state of things is provided for by the man-holes, which are inserted at intervals in the streets. These loathsome fumes are being belched into the streets night and day. When the tides are high they rush under the ship canal, through the inverted syphons provided to carry off the sewage, and cause the contents of the sewers to be regurgitated through the gullies into the streets. The result is that the small-pox is confined to the areas drained by the central and southern sewers in which this condition of things exists. It seems conclusive that the disease is due to a sewer malaria, such as prevailed in the palaces of kings in the last century, when there were cesspits in every basement and sanitation was in the condition to be seen in South Gloucester to-day." Lieut.-Gen. Phelps, in "The Vegetarian," 13th June 1896, p. 283. This may be taken as an instance of grotesquely exaggerated ideas as to Gloucester drainage.

" generated in the old culverts, and the man-holes got a reputation which has never " left them, and it was not till 1885 that the last of these old culverts was done away " with, when a marked improvement in the death-rate immediately followed. Since " then," Mr. Read added, " nearly 600 ventilating shafts have been put up as " permission could be obtained, and the smells from the man-holes have been reduced " to be a minimum, only a small percentage of them creating a nuisance under " certain conditions of the atmosphere."

Lastly, it may be of interest to note that of 1,089 houses invaded by small-pox during this epidemic, 452 drain into the northern outfall, 469 into the central, and 168 into the southern outfall; no fewer than 350 of the houses in the South Hamlet draining into the northern sewer. As this last-named sewer has not been adversely criticised its connexion with almost as many infected houses as the central sewer seems to require explanation from those who believe in the sewer-gas theory.

§ 3.—POPULATION, BIRTH AND DEATH RATES.

For information upon the vital statistics of Gloucester I am indebted to the Annual Reports of the Medical Officer of Health to the Urban Sanitary Authority. These reports from 1875 to 1888 were prepared by Mr. John Wilton, those from 1889 onwards by Dr. John Campbell, the present Medical Officer of Health.

Population.

The population of Gloucester at the census of 1891 was 39,444, and the estimated population of the city at the end of 1895, based on the rate of increase in the previous decennium, would be 40,616.*

The estimate at the end of 1894 was 40,282, apportioned by Dr. Campbell amongst the four registration districts as follows :—

I.—Kingsholm	- 2,666	Density	- 10·06 per acre.
II.—St. Nicholas	- 7,522	" -	- 21·43 "
III.—South Hamlet	- 21,992	"	- 31·41 "
IV.—St. John Baptist	- 8,102	" -	- 64·3 "

Birth-rate.

The annual birth-rate during the past 20 years has varied from 43·8 in 1876 to 30·6 in 1887, the mean being 34·7 per 1,000 of population.

Death-rate.

The annual death-rate during the same period has varied from 23·2 in 1875 to 14·8 in 1887, and the mean being 18·8 per 1,000 of population.

The figures on which these computations are made differ from those of the estimated population given in the published reports. They are based on the assumption that the annual increase in population has been uniformly the same in each year in the intervals of the census. Thus, in 1871 the census returns gave a population of 31,804; in 1881, of 36,552, an increase of 4,748 during the decennium. In 1891 the population was 39,239, which would yield a much smaller increase than in the previous 10 years, viz., 2,687. Assuming further that the increase has been uniformly the same since 1891 as in the 10 years preceding, the estimated population at the end of 1895 would be 40,314. It is needless to point out that these figures are quite arbitrary, and that they can only be fairly approximate to the real numbers. Still they furnish perhaps a sounder basis for the calculation of the rates of births and deaths than the higher estimates arrived at by other methods.

It will be seen that there has been a decline both in the birth-rate and death-rate during this period, the means for each five years being :—

Period.	Mean Birth-rate.	Mean Death-rate.
1875–1879 - -	38·4	21·5
1880–1884 - - -	34·1	19·2
1885–1889 - -	32·1	16·5
1890–1894 - -	31·5	18·2

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* The house-to-house visitation made in April to May 1896, by direction of the Vaccination Committee of the Board of Guardians, accounted for a population of 39,857.

CITY OF GLOUCESTER.—POPULATION; BIRTHS AND DEATHS.

Year.	Estimated Population.	Births.		Deaths.	
		Total.	Per 1,000 of Population.	Total.	Per 1,000 of Population.
1875	33,703	1,262	37·4	783	23·2
1876	34,178	1,497	43·8	734	21·4
1877	34,652	1,251	36·1	738	21·3
1878	35,127	1,279	36·4	728	20·7
1879	35,602	1,364	38·3	746	20·9
1880	36,079	1,264	35·	754	20·9
1881	36,552	1,256	34·3	635	17·3
1882	36,820	1,279	34·7	810	22·
1883	37,080	1,262	34·	668	18·
1884	37,358	1,231	32·9	675	18·
1885	37,627	1,231	32·7	699	18·8
1886	37,895	1,304	34.4	605	15·9
1887	38,166	1,171	30·6	568	14·8
1888	38,433	1,197	31·1	637	16·5
1889	38,702	1,250	32·	650	16·7
1890	38,971	1,228	31·5	676	16·8
1891	39,239	1,284	32·7	807	20·5
1892	39,507	1,255	31·7	716	18·1
1893	39,777	1,254	31·5	807	20·2
1894	40,046	1,216	30·3	618	15·4
1895	40,569	1,301	32·	749	18·46

NOTE.—The above estimates of population between the census years are reckoned on the assumption that the annual increment was one-tenth of that in the whole preceding decennium, and that since 1891, a like rate of growth has continued as prevailed between 1881 and 1891. This reckoning makes the figures much less than those estimated at the time, and consequently gives higher rates than those published at the end of each year.

§ 4.—ZYMOTIC DISEASES.

During the 20 years, 1875-1894, for which alone statistics are available, Gloucester contrasts not unfavourably with many other towns in respect to zymotic disease. The Notification Act was only put into force in the city in the year 1891, so that for the greater part of this time there are only mortality returns available to indicate the extent of such diseases. However, each of the annual reports of the medical officer of health contains a "Table of Sickness," mainly compiled from returns of illness among (*a*) the inmates of the union, (*b*) those having out-door relief, (*c*) patients of the general and children's hospitals, and (*d*) of the hospital for infectious diseases. The figures derived from these sources do not, therefore, represent the actual amount of zymotic disease, but they indicate fairly the fluctuations year by year, and may be useful to compare with the death-returns of the same period.

GLOUCESTER.—CASES OF ZYMOTIC ILLNESS, 1875-1894. (1875 to 1891 limited to Paupers and Hospital Patients).

YEAR.	Small Pox.	Measles.	Scarlet Fever.	Enteric Fever.	Continued Fever of Doubtful Nature.	Diphtheria (and Croup).	Diarrhœa.
1875	29	58	35	11	18	—	103
1876	1	2	129	13	15	—	108
1877	1	17	28	33	23	2	96
1878	1	35	4	17	41	5	156
1879	—	1	1	7	21	3	104
1880	—	84	2	16	51	4	263
1881	8	17	30	19	24	6	155
1882	—	38	356	9	19	5	87
1883	3	6	103	26	48	2	135
1884	—	128	31	45	83	3	165
1885	2	38	19	16	34	9	95
1886	1	4	11	24	17	3	155
1887	—	18	54	24	2	1	162
1888	1	170	4	29	40	1	131
1889	—	6	22	75	36	4	147
1890	6	15	3	21	*	16	106
1891	—	*	11	1	*	27	*
1892	—	*	352	13	*	138	*
1893	3	*	286	33	*	62	*
1894	7	*	107	43	*	31	*
1895	26†	*	65	18	*	26	*

* No returns for these years, these diseases not being scheduled in the Notification Act which came into forceNovember 1st, 1891.
† Notifications only.

From this return it would appear that *small-pox* occurred mostly in isolated cases in 12 of these years, the largest number being in 1875, which saw the close of a severe epidemic, of which, unfortunately, no records remain. That *measles* prevailed mostly in 1888, 1884, and 1880; *scarlet fever* in 1882, 1892, 1893, 1876, 1894, and 1883; *enteric fever* in 1889, 1884, 1894, 1877, and 1893; and *diphtheria* in 1892, 1893, and 1894, the mean annual number being exceeded in these years in the order indicated.

If these figures are to be taken as in any degree indicative of the *prevalence* of these diseases, their fatality must have varied considerably, for a study of the mortality returns during the same period shows that there is often a marked divergence in the results gathered from these two sources.

The mean annual zymotic mortality for the 20 years, 1875 to 1894, was 89·2, and this was exceeded in the years 1875, 1876, 1877, 1878, 1880, 1882, and 1888. The maximum excess was in 1882, and was largely due to the high mortality from scarlet fever in that year.

Regarding individual diseases, it will be seen from the following tables and Chart I. that eight deaths occurred from *small-pox* in the 20 years, seven of these being in 1875, and one in 1886. The mortality from scarlet fever exceeded the annual mean of 25·1 in each of five years, being highest in 1882, with 178 deaths, then 1876 with 141 deaths, 1877 with 58 deaths, 1883 with 57 deaths, and 1880 with 41 deaths. Since 1883 the mortality has been very small. The returns of *measles* contrast with those of scarlet fever in showing an excess over the mean annual mortality (13·9) in the seven years, 1877, 1880, 1884, 1888, 1890, 1891, and 1893, thus only coinciding with scarlatinal mortality in the first two of these years. *Enteric fever* shows a mortality below the mean (8·8) since 1889, the years of greatest excess being 1878 and 1880, in each of which there were 12 deaths. *Diphtheria* (and croup), on the other hand, has six years in which the deaths exceeded the mean for the whole period—in 1884, 1885, 1890, 1891, 1892, and 1893, the latter years especially being marked by undue prevalence of this disease.

The relative mortality from each of the diseases included in the zymotic class is given below, where for each year the proportion of deaths in each disease to that of the whole class is reckoned. During the 20 years, 1875-1894, the highest share in this mortality has been taken by scarlet fever, which accounts for 28 per cent. of the whole number of zymotic deaths; next diarrhœa, with nearly 24 per cent.; measles, with 15·5 per cent.; whooping cough, with 14 per cent.; diphtheria, 10 per cent.; enteric fever, 8 per cent.; and lastly, small-pox, with 0·5 per cent.

CITY OF GLOUCESTER, 1875 TO 1895.

Deaths from Zymotic Disease.

YEAR.	Deaths from all Causes.	Small-Pox.	Measles.	Scarlet Fever.	Enteric Fever.	Diphtheria (and Croup).	Diarrhœa.	Whooping Cough.	Total Zymotic Deaths.	Proportion of Deaths from Zymotic Disease per 100 Deaths from all Causes.
1875	783	7	8	26	9	1	43	7	104	12·9
1876	734	—	—	141	11	2	29	9	192	26·2
1877	738	—	28	58	9	3	12	26	136	18·4
1878	728	—	12	9	12	1	49	23	106	14·5
1879	746	—	—	1	6	6	12	27	52	7·0
1880	754	—	41	1	12	9	49	10	122	16·1
1881	635	—	1	22	6	3	10	15	57	9·0
1882	810	—	11	178	6	4	23	3	225	27·7
1883	668	—	5	36	9	3	26	7	86	12·8
1884	675	—	22	5	8	10	22	13	80	11·8
1885	699	—	6	3	2	16	11	23	61	8·8
1886	605	1	—	1	8	4	24	8	46	7·6
1887	568	—	5	7	7	5	12	2	38	6·6
1888	637	—	57	1	8	5	10	10	91	14·2
1889	650	—	2	—	8	3	14	26	53	8·1
1890	676	—	23	—	4	14	19	2	62	9·1
1891	807	—	16	—	5	26	11	18	76	9·4
1892	716	—	3	9	3	39	11	3	68	9·4
1893	807	—	36	3	2	14	22	6	83	10·2
1894	618	—	3	2	7	9	16	12	49	7·9
1895	749	5	—	2	5	6	33	11	62	8·4

City of Gloucester, 1875 to 1895.

Proportion of Deaths from Zymotic Diseases per 100 *Zymotic Deaths.*

(Plate II.)

Year.	Small-Pox.	Measles.	Scarlet Fever.	Enteric Fever.	Diphtheria (and Croup).	Diarrhœa.	Whooping Cough.
1875	6·9	7·9	25·7	8.9	0·9	42·5	6·9
1876	—	—	73·4	5·7	1·	15·1	4·7
1877	—	20·6	42·6	6·6	2·2	8·9	19·1
1878	—	11·3	8·5	11·3	0·9	46·2	21·7
1879	—	—	1·9	11·5	11·5	23·0	51·9
1880	—	33·6	0·8	9·8	7·4	40·1	8·2
1881	—	1·7	38·6	10·5	5·2	17·5	26.3
1882	—	4.9	79·1	2·6	1·7	10·2	1·3
1883	—	5·8	41·8	10·4	3·4	30·2	8·1
1884	—	27·5	6·2	10·	12·5	27·5	16·2
1885	—	9·8	4·9	3·3	26·2	18·	37·7
1886	2·1	—	2·1	17·4	8·7	52·1	17·4
1887	—	13·1	18·4	18·4	13·1	31·6	5·2
1888	—	62·6	1·1	8·8	5·5	10·9	10·9
1889	—	3·7	—	15·1	5·6	26·4	49·0
1890	—	37·1	—	6·4	22·5	30·6	3·2
1891	—	21·	—	6·6	34·2	14·4	23·6
1892	—	4·4	13·2	4·4	57·3	16·1	4·4
1893	—	43·3	3·6	2·4	16·8	26·5	7·2
1894	—	6·1	4·1	14·3	18·3	32·6	24·5
1895	—	—	—	—	—	—	—

In 1882 one death is ascribed to "vaccinia," and in 1884 one to "vaccination." In 1883 there is recorded a death from "chicken-pox."

Small-pox.—In 1874 there was a severe outbreak of small-pox, causing, according to the returns of the Registrar-General, 97 deaths. Unfortunately, there is no record of this epidemic.* I am informed that there were many malignant cases, and that the majority had to be treated in their homes, as there was not at first any hospital accommodation. In 1875 there were 29 cases with seven deaths.

1876.—A man came from Cardiff with an eruption on the face, for which, on his arrival, he consulted a medical man. The nature of his affection being recognised, he was forthwith sent to hospital, and, therefore, did not enter any house in Gloucester. No other case arose.

1877 and 1878.—In each of these years a single case of small-pox came to the knowledge of the authorities, and was removed to hospital.

1881.—Eight cases (six under five years of age) are returned in the "Table of Sickness" under the column of hospital "Out-patients." There were no deaths.

1883.—Three cases removed from a ship in Sharpness Docks to hospital.

1885.—One case sent to hospital by the medical officer to the union.

1886.—A tramp was admitted to hospital.†

1888.—One case admitted to hospital.

1890.—Six cases known to the authorities. Information was received by the medical officer of two cases in one house, which he had at once isolated and supervised. Another case occurred in the adjoining house. About the same time a sailor in a ship in the docks developed small-pox and was removed to hospital. Subsequently, two other cases in a house in another quarter of the city, were removed to hospital. Dr. Campbell made the following comments after mentioning the first cases:—"A week or two afterwards two cases occurred in another street of the city, and the "same prompt measures were adopted with like result. I feel sure that a threatened

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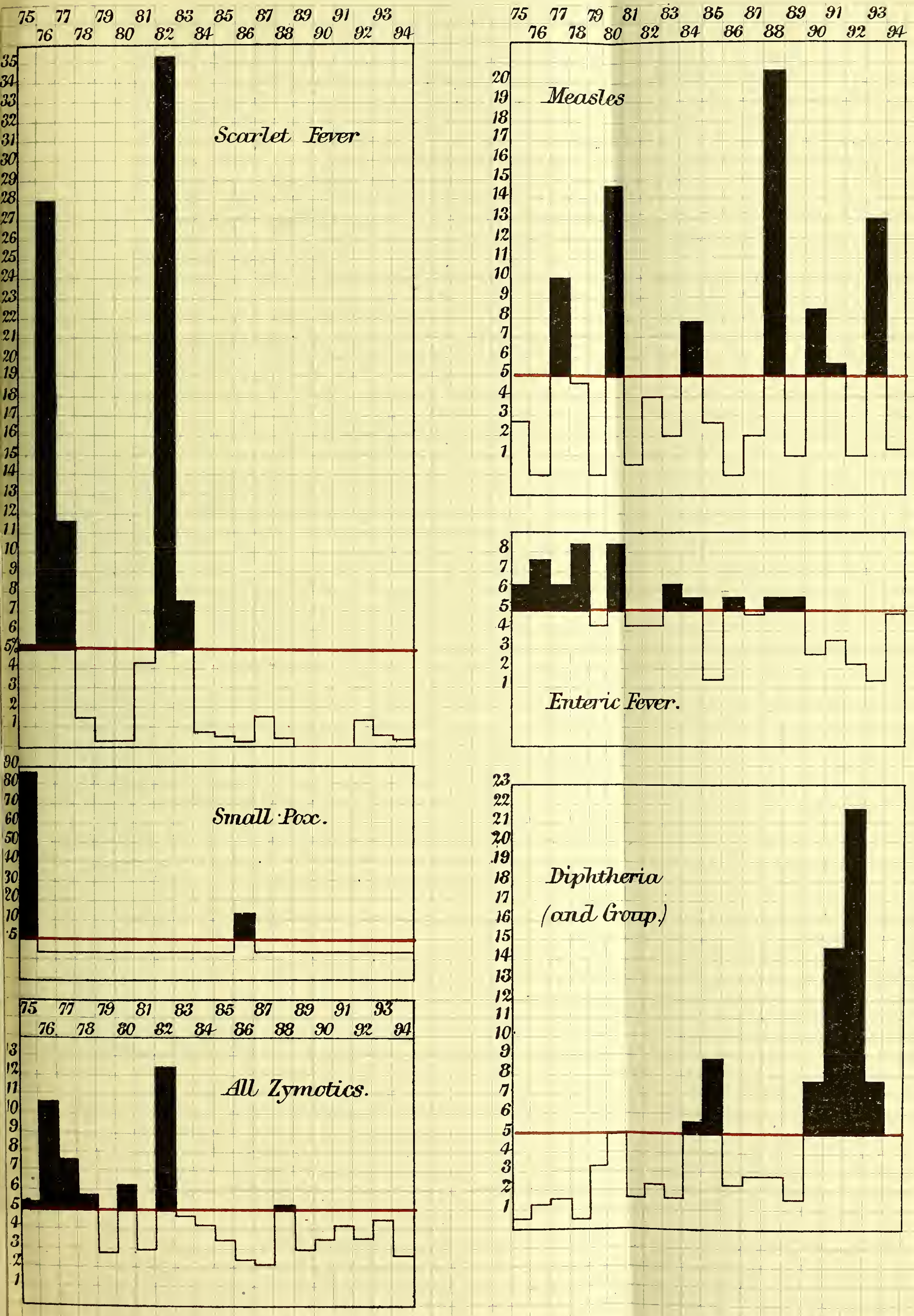
* *See* Addendum on page 32.

† There may have been another case in this year, as one death is reported, and the above case is mentioned as having been discharged from hospital cured.

Plate II.

GLOUCESTER; COMPARATIVE ANNUAL MORTALITY FROM ZYMOTIC DISEASES. 1875-1894.



WYMAN AND SONS L^TD LITH 9019.6.97

To face p. 22.

" epidemic was thus averted, for I have no doubt that had I not been made aware of
" the existence of the *first two* cases, happening as they did in a small house occupied
" by a large family, and subsequently of the advent of the other cases in time,
" probably the city would have had a very serious outbreak of this disease, which
" might at the present time assume serious proportions from the fact that nearly all,
" or a large proportion of, the young children of the city remain unvaccinated."—
Annual Report for 1890, p. 5.

1893.—Three cases were notified, one a woman sent on to the hospital from the workhouse, where she had applied for relief, and the others, at intervals, in different quarters of the city. They were promptly removed. There were no deaths. Dr. Campbell writes:—We are still on the alert, as a severe epidemic of the disease
" has been raging at Birmingham on one side of us, a good few cases at Stroud, near
" us, and I believe that there are a great many cases at Bristol. So that we are
" in the centre of a circle with many cases all around us."—Annual Report, 1893, p. 14.

1894.—Seven cases notified at different periods, none of them traceably connected with each other. All were promptly removed and their homes disinfected.

§ 5.—Procedure in Cases of Small-pox.

I was informed by Dr. Campbell that the following was the procedure adopted at the earlier period of the epidemic with regard to all cases of small-pox. On receipt of the notification, the Medical Officer of Health visited the house, confirmed the diagnosis, and directed the sanitary inspector to remove the case to hospital. Removal was in all cases promptly done. The bedding, carpets, &c. in the rooms occupied by the patients were destroyed by the sanitary authority, and compensation granted by the sanitary committee of the town council. The remaining inmates of the house were then kept at home under " quarantine " surveillance for a period of 14 days after the removal of the case. Or, if the case were not removed, the " quarantine " was prolonged until 14 days after the patient had been declared free from infection.

After the close of the quarantine period the house was disinfected by the sanitary authority. The room which had been occupied by the patient was sprayed with mercuric chloride solution, and fumigated with sulphur for a period of six hours. The windows and doors were then thrown open, and the floors cleaned with carbolic soap. The ceilings were limewashed, and the walls mostly re-papered.

As the epidemic increased in extent, some of these steps could not be carried out from lack of the necessary staff; the medical officer no longer visited the houses, unless in cases of doubt, and the quarantine was carried on without daily surveillance. From my own observation, however, I believe that most of the people loyally adopted the " quarantine " system, and remained in their houses until set free by order of the sanitary authority.

§ 6.—The Hospital for Infectious Diseases.

The Stroud Road Hospital was first established about 1875, the corporation borrowing 700*l*. for that purpose under a sanction of the Local Government Board, dated 28th February 1876, and erecting the hospital on a large area of land belonging to the corporation. The hospital, as originally established, was constructed mainly of wood, and comprised a small administrative building and a separate block (No. 1) comprising two wards of eight beds each. This block was enclosed with brick work, divided into four wards, and otherwise much improved in 1884.

The first use to which the building was put was to accommodate cases of small-pox, of which there was then a severe epidemic in the city. In 1878 there were 11 cases admitted, one of which proved fatal. The medical officer, in recording this, urges the need for improved appliances for the disinfection of clothing, &c. In the following year three patients were admitted, one of small-pox, two of scarlet fever, a disease for which the building was mainly intended. Yet its object as an isolation hospital for that disease must have had little, if any, effect on its spread, since but a minimal proportion of those attacked by it in any year were removed, as these figures show:—

Year.	Small-pox.		Scarlet Fever.	
	Cases known.	Admissions.	Cases known.	Admissions.
1875 - -	29	11	35	—
1876 - -	1	1	129	2
1877 - -	1	1	28	4
1878 - -	1	1	4	—
1879 - -	—	—	1	—
1880 - -	—	—	2	1
1881 - -	8	—	30	1
1882 - -	—	—	356	12
1883 - -	3	3	103	13

Mr. Wilton, then medical officer of health, alluding to the small advantage taken of the hospital, attributes it to the fact that a slight charge was made for admission; but he also (in his report for 1882) mentions the fact that the building was ill-adapted for its purpose, and defective in construction. He cites and supports the recommendation which had been made by Dr. Thorne Thorne, who inspected the building on behalf of the Local Government Board, that the urban and rural sanitary authorities should combine to institute a Joint Infectious Diseases Hospital, sufficiently commodious for the needs of the districts. Some of the structural defects were remedied in the alterations in 1884, but Mr. Wilton still points out that the formation of the hospital was such that it would not be possible to have two different classes of infectious disease in the wards at the same time without risk of transference of contagion; he also mentions defects in ventilation.

Year.	Small-pox.		Scarlet Fever.	
	Cases known.	Admissions.	Cases known.	Admissions.
1884 - -	—	—	31	—
1885 - -	2	2	19	3
1886 - -	1	1	11	1
1887 - -	—	—	54	7
1888 - -	1	1	4	3
1889 - -	—	—	22	14
1890 - -	6	6	3	?
1891 - -	—	—	11	?
1892 - -	—	—	352	157
1893 - -	3	3	286	119
1894 - -	7	7	107	85

In 1892 the hospital was enlarged by the erection of Blocks 2 and 3 by Messrs. Humphreys and Co., and from this year the proportion of admission to attacks has risen considerably. The new blocks each contained two wards of eight beds each, separated by a kitchen, room for nurses, pantries, &c., and having a bath-room and w.c. at one end. A laundry and mortuary were also erected in 1892 by Messrs. Humphreys and Co.

It may be convenient here to summarise the further steps taken to extend the hospital accommodation during the present epidemic.

Blocks 1, 2, and 3 were available on the outbreak of small-pox.

Owing to the sudden increase in the number of cases the Sanitary Committee, on the 24th January 1896, authorised the Medical Officer of Health to make use of the hospital of the Port Sanitary Authority at Hempsted (16 beds) which had not previously been used.

On the 29th January 1896 the Sanitary Committee accepted an estimate for erecting at Hempsted an additional block, comprising two wards of 10 beds each, with kitchen, bathrooms, &c., complete.

On the 5th February 1896 the Committee accepted an estimate for another block to be erected near the Stroud Road, and several other blocks were afterwards erected there.

The accompanying maps show the situation and general arrangement of the Stroud Road Hospital, and the following table shows the dates at which the various blocks were opened or available for use :—

Stroud Road	Block 1.	(16 beds.)	Available before outbreak of small-pox.	
	,, 2.	(16 ,,)		
	,, 3.	(16 ,,)		
Hempsted	,, A.	(16 ,,)	Opened 28th January.	Closed 27th May.
	,, B.	(38 ,,)	,, 25th February.	,, 27th May.
Stroud Road	,, 4.	(20 ,,)	,, 26th February 1896.	
	,, 5.	(20 ,,)	,, 12th March 1896.	
	,, 6.	(20 ,,)	,, 17th March 1896.	
	,, 7.	(20 ,,)	,, 4th April 1896.	
	,, 8.	(30 ,,)	,, 6th April 1896.	
	,, 9.	(30 ,,)	,, 19th April 1896.	
	,, 10.	(38 ,,)	,, 2nd May 1896.	
	,, 11.	(38 ,,)	,, 12th May 1896.	
	Total -	318 beds.		

The above table gives the number of beds (for adults) for which each block was intended; but, as many of the patients were young children some of the blocks were used for a larger number than that stated in the table.

In addition to the blocks above-mentioned the sanitary authority erected two large blocks for the nurses engaged at the Stroud Road Hospital; also an additional laundry, and a building for working a Washington Lyon's improved steam disinfector, which was purchased in January 1896.

Hospital Staff.—Prior to the outbreak of small-pox, the permanent staff at the hospital consisted of the caretakers (man and wife), who had both had considerable experience in the nursing of patients, and a messenger; but other nurses and servants were appointed when required.

During the progress of the small-pox epidemic the staff was from time to time increased until, at the end of April last, it comprised :—

Paid Staff.—Medical officers, four, in addition to Medical Officer of Health (three at Stroud Road, and one at Hempsted); custodians, two; charge nurses, 10; other nurses, 33; laundresses and other servants, 10; disinfecting men, four; porters, two; and messenger, one.

Volunteers (*unpaid*).—Two sisters of the Order of St. John the Baptist, Clewer, from St. Lucy's Home.

Two nurses from Children's Hospital.

Two other trained nurses, one taking the place of one of the sisters.

One untrained nurse.

My first visit to these hospitals was made on 3rd April 1896. On that day there were 155 patients in the Stroud Road hospital, and 55 at Hempsted, the majority being children. Both buildings were fully occupied, indeed the first-named contained more than it could well accommodate; several large double beds having two or even four occupants, namely, with children of five years and under who were convalescing from small-pox. The primary object of my visit being to see the patients, I did not think it incumbent upon me to inspect the hospital or inquire into the administration. I can only say that even with this regrettable overcrowding (due to an attempt to isolate every case) the wards struck me as being provided with ample cubic space, as well as well lighted and ventilated. The medical charge of the Stroud Road hospital was being undertaken by Mr. Pitt, under the direction of the Medical Officer of Health, and I was impressed by the zeal and devotion which Mr. Pitt showed and with the overwhelming amount of work which fell to his lot. Under these exceptional circumstances it can hardly be wondered at that administration had to give way to the imperative calls for medical attention on the large number of acute cases. It is much to be regretted that earlier steps were not taken to increase the hospital staff so as to have prevented the occurrence of numerous and grave administrative defects which were revealed shortly afterwards when Dr. Brooke, of the Metropolitan Asylums Board, was appointed Superintendent. At the same time it must be remembered that the conditions were such as to tax the utmost resources of any institution. The Hempsted hospital contained in one block many children who had been transferred during convalesence from Stroud Road. There were also two wards for acute cases. The nursing was being done by sisters from the Clewer House of Mercy; and Mr. Fort, who had the medical charge, visited the building daily.

It will be seen from the annexed plans that the ground upon which the hospital stands has become considerably surrounded by dwellings since it was first opened. Many new roads have been formed or are in process of formation, the houses in them being for the most part semi-detached villas or short tiers of terraces. The ground that is still open and that is not taken up by the hospital site is used for allotments and pasturage.

§ 7.—Vaccination in Gloucester.

The subjoined return of the vaccinations in the Gloucester Union for the 10 years 1885–1894, demonstrates the fact that the number of children under the age of 10 who had not been vaccinated at the time of the outbreak of small-pox was considerable. It will be seen that a great rise in the number of those in default commenced in 1887, and in February of that year the board of guardians, by a majority of 12 votes, resolved—"That the vaccination officers take no further steps "in vaccination prosecutions until authorised by this Board."*

Gloucester Union.

Year.	Number of Births returned in the "Birth List Sheets" as registered.	Number of these Births duly entered in Columns 10, 11, and 13 of the "Vaccination Register" (Birth List Sheets), viz.:—				Number of these Births which remained unentered in the "Vaccinated Register" on account (as shown by the Report Book) of			Number of these Births remaining neither duly entered in the "Vaccination Register" (columns 3, 4, 5, and 6 of this Return), nor temporarily accounted for in the "Report Book" (columns 8, 9, and 10 of this Return).	Remarks.
		Col 10.	Col. 11.		Col. 13.	Postponement by Medical Certificate.	Removal to Districts the Vaccination Officer of which has been duly apprised.	Removal to Places unknown or which cannot be reached; and cases not having been found.		
		Successfully vaccinated.	Insusceptible of Vaccination.	Had Small-pox.	Dead Unvaccinated.					
(1.)	(2.)	(3.)	(4.)	(5.)	(6.)	(8.)	(9.)	(10.)	(11.)	
1885	1,447	1,148	—	—	145	32	3	42	77	77 summoned before magistrates and fined.
1886	1,467	1,095	—	—	106	24	1	62	179	50 summoned before magistrates and fined; 129 in default.
1887	1,468	472	—	—	132	2	2	74	786	In February of this year the vaccination officers were ordered to take no proceedings.
1888	1,438	140	—	—	157	5	—	84	1,052	In default 8,965.
1889	1,526	95	—	—	161	1	—	77	1,192	
1890	1,445	60	—	—	183	—	—	66	1,136	
1891	1,551	34	—	—	204	—	1	109	1,203	
1892	1,518	39	—	—	160	—	—	86	1,233	
1893	1,515	38	—	—	174	—	—	97	1,206	
1894	1,492	34	—	—	187	—	—	114	1,157	
Totals	14,867	3,155	—	—	1,609	64	7	811	9,221	

11th April 1896.

L. G. H. Mayer,
Clerk to the Guardians,
Gloucester Union.

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* The Vaccination Committee of the Board of Guardians, which reported in August 1896, includes in its report the following statement of the public and private vaccinations registered during the last 10 years:—

1886	1,095
1887	472
1888	140
1889	95
1890	60
1891	34
1892	39
1893	38
1894	34
1895	371
Total for 10 years	2,378

In November 1895 (when the number of cases had only reached about a dozen) the Sanitary Committee authorised the Medical Officer of Health to report the facts to the Guardians, and when doing so the Medical Officer strongly urged the importance of vaccination.

On the 13th January 1896, the Medical Officer reported to the Sanitary Committee that there were 36 cases in the hospital, and that several additional cases had been notified and would be admitted into the hospital during the day; and by direction of the Committee the town clerk wrote to the Guardians "strongly urging them to " enforce the provisions of the Vaccination Acts, and to encourage vaccination and " re-vaccination in order to prevent the further spread of the disease."

On the same date (13th January) the Sanitary Committee instructed the Medical Officer of Health to at once report the facts to Dr. Batten (the senior physician on the infirmary staff), and through him invite the advice and co-operation of the members of the medical profession in dealing with the outbreak.

A meeting of the profession (convened by Dr. Batten) was held at the Guildhall on the 16th January when resolutions were passed recommending increased hospital accommodation, and strongly urging vaccination.

" At a Meeting of the Medical Profession of this City, convened by Dr. Batten in consequence of on official communication from the Sanitary Committee with reference to the Epidemic of Small-pox, held at the Guildhall, on Thursday, the 16th day of January 1896.

" PRESENT:

" Dr. Batten in the chair, and 21 other medical men.

" Resolved :—

" That this meeting of the medical profession of the City of Gloucester, in response to the courteous invitation of the Urban Sanitary Committee for advice and assistance in the present serious outbreak of small-pox, desires to express its readiness to assist the Sanitary Authority and its *unanimous* opinion :—

(1.) That the accommodation at the Hospital for Infectious Diseases should be at once increased; and that the plans should be such as will admit of still further extension, if necessary, so that every case of small-pox may be removed from the home to the hospital without delay.

(2.) That we have *no hesitation whatever* in expressing our belief that "successful" vaccination in early life and re-vaccination at a proper interval afterwards is an effective and the only available means of protection against an attack of small-pox, and that it is the duty of all parents to provide such protection for their children.

(3.) That the Guardians be urged to comply with the provisions of the Vaccination Acts and the General Order made by the Local Government Board thereunder, and in particular with Article 16 of such Order; and also to instruct the vaccination officers to fully carry out their duties under the said Acts and Order.

(4.) That it is desirable that steps be taken by a house-to-house visitation, and (with the co-operation of the school authorities) by examination of the children attending the elementary schools, to prepare lists of unvaccinated persons with a view to insure their prompt vaccination.

(5.) That in view of the intimate relations of the city and rural districts, especially in their suburban connexions, it is expedient, both in regard to efficiency and economy, that the Urban Sanitary Authority and the Rural District Council should combine to provide such permanent accommodation as may be necessary to meet any future outbreak of infectious disease.

Resolved also :—

That copies of these resolutions be sent to—

The Gloucester Urban Sanitary Authority,
The Guardians of the Poor of the Gloucester Union,
The Rural District Council,
The Local Government Board,
The Local Press, and
The Medical Press.

RAYNER W. BATTEN,
Chairman.

On the 28th January the Medical Officer of Health presented a further report giving information asked for by the Guardians, and a copy thereof was sent to the Guardians.

On the 11th March the Sanitary Committee wrote urging the Guardians to " consider " the expediency of appointing additional public vaccinators, and offering further " facilities for vaccination."

On the 18th March the Committee approved of a " circular to employers," urging the extreme importance of prompt vaccination. About 450 copies of this circular were sent out.

" *Private Circular to Employers.*

" SMALL-POX.

" Having regard to the very serious consequences resulting from the prevalence of small-pox in this city, the Sanitary Committee of the corporation request employers of labour to urge upon their employees the extreme importance of vaccination.

" The Committee are giving every attention to general sanitary precautions, but are advised that vaccination and isolation are the only reliable means of checking the epidemic; and they are assured that if the vaccination of children and re-vaccination of adults were promptly and thoroughly carried out there is every reason to hope that the disease would be at once checked and very soon stamped out.

" In addition to the distress occasioned to the families of those afflicted, the epidemic is very seriously affecting the trade and welfare of the city; and unless promptly checked, it may at any moment interfere with and possibly result in the closing of various works and other centres of employment, just as it has already necessitated the closing of several of the public elementary schools.

" Although most anxious not to cause unnecessary alarm or to give undue publicity to a state of things which everyone must regret, the Sanitary Committee feel it their duty to ask employers of labour to *privately* lay these facts before their employees and urge them to assist the Sanitary Authority to check the epidemic by at once arranging for the vaccination of the children and the re-vaccination of themselves and other adults in their respective households, and by inducing their friends and neighbours to adopt a similar course. It may be well to intimate that all persons may be vaccinated (with calf lymph if desired) without any charge.

" The committee trust that all citizens, including those who hitherto have been opposed to vaccination, will under existing circumstances give due consideration to this strong and unanimous recommendation, especially as it is supported by the unanimous opinion of all the medical men in the city.

" Signed by direction of the Sanitary Committee,

" GEO. SHEFFIELD BLAKEWAY,
" Town Clerk.

" JOHN CAMPBELL, M.D.,
" Medical Officer of Health.

" Guildhall, Gloucester,
" 13th March 1896."

On March 24th, at the Board of Guardians, a resolution moved by the Rev. J. H. Seabrook, seconded by Mr. Dennis Reardon, was carried by a majority of nine, 31 voting in its favour and 22 against. It was—

> " That the vaccination officer of this union be hereby directed to carry out Article 16 of the General Order of the Local Government Board of the 21st October 1874 relating to vaccination, in accordance with the terms of the resolution passed by this board in September 1876."

On the 27th March the Local Government Board replied to the letter of the Sanitary Authority advising that under existing circumstances the only means that could be relied on to control the further diffusion of small-pox would be the immediate organisation of a general system to procure the prompt vaccination of all unvaccinated persons under 14 years of age, and the re-vaccination of all persons over 10 years of age who had been primarily vaccinated in infancy.

"Small Pox.

" (*Copy Letter.*)

No. 40,055 K2.
1896.

" Local Government Board,
" Whitehall, S.W.,
" 27th March 1896.

" Sir,

" I am directed by the Local Government Board to acknowledge the receipt of your letter of the 18th instant respecting the outbreak of small-pox at Gloucester, and to state that they learn that, notwithstanding the adoption of the Town Council of such steps as—

> (*a*) The prompt isolation, at first, of every case of small-pox notified. (*b*) The subsequent extension of small-pox hospital accommodation. (*c*) The burning of infected articles. (*d*) The disinfection of houses, &c., and (*e*) the imposition of " quarantine " so called, on the occupants of infected dwellings, yet the disease is still extending in the city.

" the Board are advised that, under existing circumstances, the only means that can be relied on to control the further diffusion of small-pox will be the immediate organisation of a general system to procure the prompt vaccination of all unvaccinated persons under 14 years of age, and the re-vaccination of all persons over 10 years of age, who have been primarily vaccinated in infancy. They trust that the decision which was come to by the Guardians on the 24th instant, to enforce the compulsory clauses of the Vaccination Acts, will be accompanied by the adoption of immediate arrangements with a view to this end.

I am, &c.
(Signed) S. B. Provis,
Assistant Secretary."

G. Sheffield Blakeway, Esq.,
Town Clerk,
Gloucester.

Copies of this letter were printed and published throughout the city, and prints thereof were sent to the Guardians, with a letter expressing the opinion of the Committee that although many persons had been vaccinated, the steps theretofore adopted were altogether inadequate, and urging the immediate organisation of a general system to carry out the work promptly as recommended by the Local Government Board.

On the 31st March the mayor and others attended a meeting of the Guardians, which was also attended by Dr. Parsons from the Local Government Board, but the arrangements made by the Guardians were not considered satisfactory, and the Sanitary Authority thereupon employed six medical men to make house-to-house visits and vaccinate persons willing to be vaccinated.

Towards the end of April the Sanitary Committee again urged upon the Guardians that the vaccinating staff was inadequate, and (acting under the advice of Dr. Sweeting of the Local Government Board) the Guardians thereupon arranged for the appointment of a full staff of vaccinators, under the direction of Dr. Bond, assisted by Dr. Carter.

The work done by this Vaccination Committee is given in full detail in the Report which has just been issued (August 1896). Six medical practitioners were appointed as assistant vaccinators ; and the city was mapped out into 13 districts, to each of which was appointed an inquirer, whose duty it was to make a house-to-house visitation to find out those who were still not vaccinated. Their work, which commenced on April 27th, was followed by the visits to each house requiring it, of the deputy public vaccinator. Calf lymph was employed, several sources of supply being drawn up.

The amount of vaccination that has been done by this means, by increasing the number of stations and otherwise, is expressed in the data supplied in the two tables subjoined which appear in the Appendix to the Vaccination Committee's Report.

Record of children born in the Gloucester District during the 10 years ending December 31st, 1895, and of their relations to vaccination :—

Total births (1) - - - - - - -	15,682
Children under 10 years of age vaccinated prior to January 1st, 1896 (2)	2,378
„ „ „ since „ „ (3)	8,400
„ „ dead to date - - - -	3,176
„ „ gone away from Gloucester - -	849
„ „ who have had small-pox and have recovered - - - - - -	523
Children known to be unvaccinated - - - - -	209
„ under three months old - - - -	200
	15,735
From above - - - -	15,682
Balance, being surplus - -	53

(1.) Obtained from the registrars of births and deaths.
(2.) „ „ registers of the vaccination officers.
(3.) This number includes vaccinations registered by (*a*) the special staff appointed by the board of guardians; (*b*) the ordinary public vaccinators and their personal assistants; (*c*) the staff employed by the city council; (*d*) the medical officers of the various public institutions; (*e*) the other medical practitioners of the city. In the case of the first four of these categories the numbers may be relied on as nearly exact, but in the last the number is only approximate, some of the medical practitioners not having kept an exact record of their primary vaccinations.

GLOUCESTER BOARD OF GUARDIANS.

Return of Vaccinations and Re-Vaccinations from January 1, 1896, *to July* 11, 1896, *as ascertained from all known Sources.*

Vaccinators.	Primary.	Re-Vaccinations.	Total.
Vaccination Inquiry Office staff - -	756	1,098	1,854
Public Vaccinators - - -	5,477	12,423	17,900
Corporation staff - - -	424	956	1,380
Private practitioners* - - -	1,827	11,875	13,702
	8,484	26,352	34,836
Number of children, 10 and under, who are stated to have beeen vaccinated in infancy - - - -	1,072	—	1,072
	9,556	26,352	35,908

* From one medical practitioner no returns at all were received.

§ 8.—THE DISTRICT NURSING SOCIETY.

One commendable feature of the present outbreak of small-pox has been the charitable work done by the District Nursing Society in providing nursing attendance upon any case which was retained at home. As the epidemic increased the resources of this Society were fully taxed, but it received support and encouragement on all hands, and proved to be of inestimable service to many families attacked by the disease. Through the kindness of Mr. H. E. Waddy, the Treasurer of the Society, I have been furnished with full particulars of its operations, which I herewith append.

"The Committee of the Gloucester District Nursing Society, noticing that the hospital accommodation was perfectly inadequate to cope with the epidemic, in the beginning of March 1896 offered to undertake the nursing outside the hospital which was evidently necessary, and for which there was no provision in existence.

"This offer was accepted by the Sanitary Authority and by the Board of Guardians, and the society took the earliest possible steps to engage the requisite staff of nurses, which had to be totally distinct from their ordinary nursing staff, who at the present moment are carrying on their ordinary nursing work.

"Their superintendent (Miss Evans) placed a deputy at the permanent Nurses' Home, and herself took the management of the small-pox nursing.

"The work was at first very arduous until sufficient nurses could be got together, but those two or three who were first engaged placed their hearts and souls in the work, and with the superintendent (who also nursed), managed to do what was requisite for some 100 or more cases, with which they commenced.

"Within a fortnight the society had a staff of some dozen nurses, trained for small-pox and coming from St. John's House, Norfolk House, and similar other establishments.

"The society has had, for about three months, 20 or more such specially trained nurses, and they employed some 20 or 30 men and women as assistants, to stop in the various houses and carry out the trained nurses directions during their absence.

"The nursing is now (June) somewhat lessening, and the society have slightly reduced its staff.

"Latterly it has had to take up cases which have been operated upon by persons who, without, and in fact contrary to, the directions of the medical men, bathe the patients in a reckless manner and then leave them as cured, when in the opinion of the medical men they are not cured and are still infectious.

"The nurses necessarily distribute a large quantity of eggs, fruit, food, flowers, &c., and they have undertaken with the Guardians that they will do what is necessary in relief for the first 24 hours, and as a fact they do not limit their distribution to this period.

"*Procedure.*

"The society's procedure is as follows :—

"Halfpenny cards are placed in the hands of the medical men and the authorities.

"The Sanitary Authority every morning sends to the society's superintendent a list of all notifications they have during the preceding day received.

"From these particulars the superintendent arranges the work among the nurses according to each nurse's district. On the nurse's return from her work she writes on Form Ka (new case of small-pox) answers to certain questions.

"That form is sent to the society's office, and from it Returns S. and G. are respectively made out (being altered as necessary) are sent to the Sanitary Authority and to the relief committe of the Board of Guardians.

"If the requirement in Returns S. and G. are not duly complied with the superintendent writes the facts on the Form Q., and sends it to the society's office, from whence a special communication (in writing) is made to the defaulting authority. This procedure is repeated until the requirements are met, the Form Q. being from time to time sent back to the nursing superintendent with Form Ac. attached to it. On this latter form the superintendent or nurses make their remarks and return the whole to the society's office.

"If difficulties arise the chairman attends at the committee of the Sanitary Authority or Guardians, as the case may require.

"As a rule the nurses are well received and their visits are looked forward to by the patients.

"Since the beginning of March the society has had over 900 small-pox cases under its care.

"*On the Termination of Nursing.*

"A Notification Form is made by the superintendent to the society's office.

"From the information thus gained returns are made out, and sent to the Sanitary Authority, and to the relief committee of the Board of Guardians.

"*Financial Matters.*

"The Nursing Society immediately they undertook the special nursing, issued an appeal to the residents in the county and the city, and the same has been answered most generously, and all classes, rich and poor, have come forward to provide the Nursing Society with means.

" The society has spared no expense in endeavouring to fulfil its part of the work, and from the systematic and energetic action of its superintendent such work has proceeded most smoothly.

" The society itself is a small one, and its ordinary subscription list is less than 200*l.* per annum.

" *Country Nursing.*

" The society has placed itself in a position to undertake the nursing of small-pox patients in all the parishes of the Gloucester Union.

" It has made suggestions to each parish with regard to it being prepared, by sending round to the chairman of each parish council a circular, and the society is ready at any moment to send trained nurses, and to pay for the women to be provided as assistants. It is believed that most of the parishes have got themselves ready in one or other of the ways indicated in the above circular, but to further insure this being done, the society in May issued a circular emphasizing the necessity for prompt treatment in the earliest stage, and pointing out that the society was prepared to immediately send the necessary nurses.

" The society has all its machinery ready to be put in operation at any moment in a manner very similar to that adopted as above mentioned in the city.

" George Whitcombe,
" June 1896. Chairman of the Special Nursing Committee."

Addendum to Part I.

Small-Pox in Gloucester in 1872–75.

Since writing the paragraphs referring to the previous occurrence of small-pox in Gloucester (page 22), I have been enabled through the courtesy of Mr. Mayer, the superintendent registrar, to consult the death registers for the years 1872–75, and have thereby gained some information concerning the mortality from small-pox in these years. In 1872 there were seven deaths from this disease, viz., January, one; March, one; April, one; May, two; October, one; November, one. In 1873 there were 49 deaths, viz., January, two; May, four; June, five; July, four; August, two; September, four; October, 11; November, nine; December, eight. In 1874 there were 97 deaths, viz., January, six; February, seven; March, four; April, two; May, three; June, 15; July, 21; August, 11; September, 10: October, five; November, nine; December, four. In 1875 there were seven deaths, viz., January, five; February, two; and none afterwards during the whole year. So that during the whole period of three years and two months there were 160 deaths from small-pox.

But it is clear that prior to May 1873 the disease could hardly be considered to be epidemic, there having been only nine deaths during the preceding 16 months, and, for three months preceding May, no deaths at all. From May 1873 to February 1875 no month passed without some fatalities, the greatest number occurring in July 1875. This outbreak may therefore be said to have lasted 22 months and to have caused 151 deaths.

The distribution of these fatal cases of small-pox in the various registration districts may be compared with that of the present outbreak. Then, as now, the majority of the cases seem to have been in the South Hamlet:—

District.	1873.	1874.	1875.	Total.
1. Kingsholm - - -	7	12	2	21
2. St. Nicholas - -	18*	38†	2‡	58
3. South Hamlet - -	19	26	3	48
4. St. John Baptist - -	3	21	—	24
	47	97	7	151

* 3 deaths in the Union Workhouse Infirmary.
† 22 " " "
‡ 2 " " "

The workhouse infirmary was used as an isolation hospital, and received cases from all parts of the city, hence the excess of deaths registered in the St. Nicholas district where the workhouse is situated. This fact renders it impossible to give an accurate estimate of the numbers attacked in each locality.

The only other point on which it is possible from these returns to get precise information is as to the age-distribution of these fatal cases of small-pox. It is as follows:—

Age.	1873.	1874.	1875.	Total.
1 month and under - -	2	2	—	4
1 month to 1 year - -	3	7	3	13
1 to 5 years - - -	3	8	1	12
5 " 10 " - -	6	16	—	22
10 " 15 " - - -	8	10	—	18
15 " 20 " - -	5	10	2	17
20 " 30 " - - -	9	24	1	34
30 " 40 " - -	4	9	—	13
40 " 50 " - - -	6	7	—	13
50 " 60 " - -	—	3	—	3
60 " 70 " - - -	1	1	—	2
	47	97	7	151

In other words, of these small-pox deaths, there occurred at ages—

Under 1 year - - 4, or a proportion of 2·6 per cent.
1 to 10 years - - 47 " " 31·1 "
10 to 30 " - - - 69 " " 45·7 "
30 years and upwards - 31 " " 20·5 "

The statement as to whether the individuals were vaccinated or not is seldom made, so that no estimate can be framed as to the incidence of the disease upon these two classes of subjects.

PART II.

§ 9. The Outbreak of Small-pox, 1895–96. Early history of outbreak, June to November, 1895. Progress of the epidemic. Its great extension in February. Conditions favouring its spread. Houses invaded during each fortnightly period. Number of cases. Mortality. Table of cases.

§ 10. Spread of Infection through School Influence. Children who were probably infected in the Public Elementary Schools.
- Widden Street School.
- St. Luke's School.

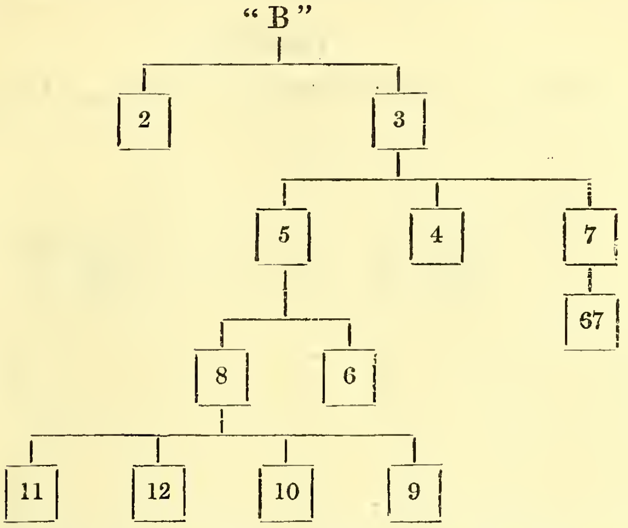
§ 10. Spread of infection, etc.—*cont.*
- Tredworth School.
- Linden Road School.
- Ryecroft School.

§ 11. Hospital Isolation. Number of cases removed to hospital. Comparison of incidence in houses from which first cases removed, and those in which they remained at home. Cases in hospital at date of opening inquiry. Hospital and home mortality compared.

§9.—Small Pox—1895–96.

Early history of outbreak.

Although during the past few years small-pox has prevailed in various parts of the country in more or less direct communication with Gloucester, and especially in places so nearly related to it as Birmingham, Bristol, and Stroud, it was not until the autumn of 1895 that the city became markedly infected. In the month of June there had been notified the case of a Midland Railway official, who was believed to have contracted the disease at Burton-on-Trent. He was promptly isolated, and no further case arose in connexion with his attack. But, as so often happens, the earliest cases in an epidemic are to be found amongst those whose nature has been unrecognised, or which have been unattended medically and not notified to the authorities. For the next case (in August) which became known was of a lad employed on the premises of a Mr. B., living in the Midland Road. Mr. B. was a commercial traveller, and although he does not appear to have contracted small-pox himself, it is highly probable that he was the medium of its importation into the city, and of the infection of one or more members of his family, whose cases were not notified. The lad referred to lived in Goodyer Street, and was not known to have infected others; but the inquiries subsequently made by Dr. Campbell, to whom I am indebted for this information, seemed to furnish the clue to other cases that subsequently arose in the city. Thus the third case notified was a fellow-shopman to a friend of Miss B., who herself had a mild attack, and went to Scotland on her recovery. I do not know whether she actually visited the shop whilst still infectious, but it is notorious that the spread of small-pox is often to be traced to individuals suffering from such mild attacks that they are able to go about. At any rate it is a singular coincidence that there should be even this indirect relationship between these cases. The next link is to be found in the probable infection of a young girl, a friend of No. 3, who was employed as nursemaid in the K. family, in Derby Road. The girl herself (No. 5) sickened in September, her case being notified on the 28th of that month; whilst the infant K. (No. 6) was attacked a few days later. On October 27th there died at a neighbour of the K's, the child E.M., 8 years of age, from what was certified as "malignent measles." She was unvaccinated, and had been taken ill on October 21st. There are eight children in this family, one other (D.M. at 5) being also unvaccinated. In the first week of November two of the children, including the last-named, and subsequently the father, were attacked with small-pox and removed to the hospital (Nos. 9, 10, 12); and at the same time a lady, who had visited the child first attacked, was also attacked. It is hardly consistent with ordinary ideas of the incubation period of small pox to believe that the child D.M. was directly infected by No. 5, although it is certain by the fact that this girl did come into the house before her illness was declared. She was removed to hospital on September 28, *i.e.*, 23 days before the child was taken ill in the M. family. Reverting to the case No. 3, it may be mentioned that Dr. Campbell has evidence of the infection through him of two other cases besides that of No. 5. These early cases, which form, as it were, a series apart, and from which it is possible that other cases may have arisen, may be diagrammatically represented in their connexions, thus :—



Scattered cases continued to arise through November and December, in various quarters of the city, so that by the end of the year there had been notified, since the middle of June, 27 cases.

It is not possible to trace the connexions between the cases that now began to increase in number, although it was not until the third week in February that the disease assumed serious proportions. In order that an accurate idea may be formed of the manner of its spread I have prepared a series of spot-maps (placed at the end of this Report, p. 182), of which the first shows the houses invaded up to January 4th, 1896, and the rest those in each succeeding fortnight to July 18th. I have also prepared lists of these houses, indicating the cases of small-pox that occurred in them, as well as the total number of the inmates of these houses of which this information was obtained, grouped in age periods.

The maps are prepared from one which is published by Mr. John Jennings of Gloucester, whom I beg to thank for his kindness in granting permission to utilise it for this purpose.

In the following paragraphs will be given a summary of the facts as to incidence in each of the 15 sections, into which the whole period has been arbitrarily divided.

I.

Progress of the epidemic; invaded houses.

June 15*th*, 1895, *to January* 4*th*, 1896.—There are known to have occurred in these 30 weeks 33 cases of small-pox, which came from 25 houses, in which subsequently 8 other cases arose. Of these 41 cases, 5 were fatal.

16 houses	yielded	1	case	of small-pox.
6 ,,	,,	2	cases	,,
2 ,,	,,	4	,,	,,
1 ,,	,,	5	,,	,,

As to their situation,—

1. Kingsholm - -	No houses.		
2. St. Nicholas - - -	2 ,,	with	4 cases.
3. South Hamlet - -	22 ,,	,,	33 ,,
4. St. John Baptist - -	1 house	,,	4 ,,

The *age* incidence of those attacked in these 25 houses was :—

1 month and under - - -	1 case,	1 death.
1 ,, to 1 year - -	—	—
1 to 10 years - - -	11 cases	3 deaths.
10 to 30 ,, - - -	22 ,,	1 death.
30 and over - - - -	7 ,,	—
	41	5

There were removed to hospital* 36, of whom 3 died.

There remained at home 5, of whom 2 died.

---

* That is of the 41 cases which occurred in these invaded houses, not the number actually removed during the period.

LIST OF HOUSES KNOWN TO BE INVADED BY SMALL-POX during the Period June 1895 to Week ending January 4th, 1896.

[MAP 1.]

With AGES of the INMATES and of those ATTACKED.

No. in House List.	Address.	District.	Inmates.					Cases.*				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
1	74, Rycroft Street -	III.	—	—	—	—	—	—	—	—	—	1
2	5, Goodyer Street -	III.	—	—	—	—	—	—	—	—	2	—
3	68, Vauxhall Road -	III.	—	—	—	3	2	—	—	—	3	—
4	8, Upton Street -	III.	—	—	—	—	—	—	—	—	4	—
5	8, Vauxhall Terrace, Milbrook Street.	III.	—	—	—	—	—	—	—	—	5	—
6	77, Derby Road -	III.	—	—	—	—	—	—	—	6	—	—
7	7, Counsel Street -	II.	—	—	—	—	—	—	—	—	7	67
8	9, Derby Road -	III.	—	—	2	6	2	—	—	*8*, 10	9	12
9	42, Derby Road -	III.	—	—	—	1	2	—	—	—	—	11
10	5, Moor Street -	III.	—	—	—	—	—	—	—	-	*13*, 17	—
11	16, King's Barton Street.	III.	—	—	—	—	—	—	—	*14*	—	—
12	2, Fowey Villa, Conduit Street.	III.	—	—	—	6	2	—	—	—	15	—
13	3, Conduit Street -	III.	—	—	—	1	1	—	—	—	16	—
14	Laurel Villa, Stroud Road.	III.	—	—	—	—	—	—	—	—	—	18
15	45, High Street -	III.	—	—	3	—	1	—	—	19, 53	—	—
16	27, Knowles Road -	III.	—	—	3	2	—	—	—	44	20	—
17	38, Morton Street -	III.	—	—	2	2	2	—	—	—	21, 28	—
18	12, Sinope Street -	III.	—	—	1	2	1	—	—	—	22	—
19	4, Wells Cottages, Sherborne Street.	IV.	—	—	—	—	—	*23*	—	39	30, 31	—
20	2, Upper Cecil Road	III.	—	—	—	—	—	—	—	—	24	—
21	17, Milbrook Street -	III.	—	—	2	3	1	—	—	34, 45	25, 36	39
22	Lorne Villa, Stroud Road.	III.	—	—	—	—	—	—	—	—	—	26
23	5, Barbican Road -	II.	—	—	—	—	—	—	—	*55*	27	—
24	14, Stratton Road -	III.	—	—	—	—	—	—	—	—	32	—
25	60, Clifton Road -	III.	—	—	2	1	3	—	—	—	33	—

* The figures in these columns refer to the Table of Cases, p. 70 *et seq.* Those printed in *italics* denote fatal cases.

II.

January 5th to 18th, 1896.—The number of cases known to have occurred in this fortnight was 25, there being new invasions of 14 houses. Altogether these houses yielded 29 cases, of which 8 were fatal:—

6 houses yeilded 1 case of small-pox.
4 „ „ 2 cases „
2 „ „ 3 „ „
1 „ „ 4 „ „
1 „ „ 5 „ „

Their situation was:—

2. St. Nicholas -	- 2	houses	with 3	cases.
3. South Hamlet -	- 9	„	„ 18	„
4. St. John Baptist -	- 3	„	„ 8	„

The *age*-incidence of those attacked in these 14 houses was:—

1 month to 1 year - - -	2 cases,	2 deaths.
1 to 10 years - - - -	16 „	3 „
10 to 30 „ - - -	4 „	—
30 and over - - - -	7 „	3
	29	8

There were removed to hospital 28, of whom 8 died.
Remained at home 1.

List of Houses known to be Invaded by Small-Pox during the Fortnight ending January 18th, 1896.

[Map 2.]

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
26	24, Theresa Street -	III.	—	—	2	3	2	—	—	—	—	*37*
27	2, Guinea Street -	II.	—	—	4	3	2	—	—	38	—	—
28	3, Wells Cottage, Sherborne Street.	IV.	—	—	—	—	—	—	—	—	40	—
29	80, New Street -	III.	—	—	2	2	2	—	—	42	61	*41*
30	9, Counsel Street -	II.	—	1	2	2	3	—	—	*71*	45	—
31	8, Albany Street -	III.	—	1	3	1	1	—	*46*	47, 51	—	—
32	7, Albany Street -	III.	—	—	2	4	2	—	—	*48*, 50	—	—
33	4, Vauxhall Terrace, Milbrook Street.	III.	—	—	—	3	3	—	—	—	—	49
34	10, High Orchard Street.	III.	—	—	4	2	1	—	—	*57*, 68, 69, 70	—	—
35	44, New Street -	III.	—	—	5	2	2	—	—	79	52	—
36	17, St. John's Lane -	IV.	—	—	—	—	—	—	*62*	43, 65	—	63, 64
37	70, Melbourn Street -	III.	—	—	2	—	2	—	—	—	—	54
38	28, Blenheim Road -	III.	—	—	—	—	—	—	—	—	—	*56*
39	29, Longsmith Street	IV.	—	—	3	2	2	—	—	58, 75	—	—

III.

January 19*th to February* 1*st*, 1896.—During this fortnight some encouragement was given to the hope that the outbreak was abating. There were 24 cases known to have arisen, but the number of newly invaded houses had fallen to 10. These 10 houses yielded 16 cases, of which three were fatal :—

7 houses yielded 1 case of small-pox.
1 house ,, 2 cases ,,
1 ,, ,, 3 ,, ,,
1 ,, ,, 4 ,, ,,

Their situation was :—

1. Kingsholm - - - -	1 house,	2 cases.
3. South Hamlet - - -	8 ,,	13 ,,
4. St. John Baptist - - -	1 ,,	1 ,,

The *age*-incidence of those attacked in these 10 houses was :—

1 month to 1 year - - -	1 case.	
1 to 10 years - - - -	2 ,,	1 death.
10 to 30 ,, - - - -	5 ,,	—
30 and over - - - -	8 ,,	2 ,,
	16	3

One was a case of a man employed on a ship in the docks (No. 1,977), who infected two other members of his family.

There were removed to hospital 16, of whom 3 died.
Remained at home none.

LIST OF HOUSES KNOWN TO BE INVADED BY SMALL-POX during the Fortnight ending February 1st, 1896.

[MAP 3.]

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
40	26, Sidney Street -	I.	—	—	1	2	2	—	—	—	59, 77	—
41	39, Robin Hood Street.	III.	1	—	3	2	2	—	—	—	60, 84	1,977
42	Shakespeare Passage	IV.	—	—	—	—	—	—	—	—	—	66
43	107, Falkner Street -	III.	—	—	4	4	2	—	—	—	72	—
44	80, Victoria Street -	III.	—	—	—	—	2	—	—	—	—	73
45	59, Brook Street -	III.	—	—	1	3	2	—	—	—	—	*74*
46	Bleak House, Station Road.	III.	—	—	—	—	—	—	—	—	—	*76*
47	8, Carmarthen Street	III.	—	1	1	—	2	—	108	*102*	—	78, 127
48	9, Baker Street -	III.	—	—	1	—	2	—	—	80	—	—
49	51, High Street -	III.	—	—	—	2	2	—	—	—	—	81

IV.

February 2nd to February 15th.—There were 28 additional cases of small-pox during this fortnight, and 22 houses newly invaded, a notable increase on the preceding fortnight. There occurred in all, in these houses, 52 cases, of which nine proved fatal :—

11 houses yielded each 1 case of small-pox.
4 „ „ 2 cases „
2 „ „ 3 „ „
2 „ „ 4 „ „
1 „ „ 5 „ „
1 „ „ 6 „ „
1 „ „ 8 „ „

The circumstances of the family in which eight cases occurred may be related. These cases continued to arise until the middle of May, so that the house was infected for fully three months. All the children were attacked, the parents alone escaping. The house (No. 56 in list), in Moor Street, is old and incommodious. All but one (No. 330, a lad of 17) were unvaccinated, and two of the patients died (No. 101, a boy of 11, and No. 1,671, a boy of 3).

In another house (No. 67) the father was the first to be attacked, then four unvaccinated children, aged 10, 8, 6, and 3 respectively (Nos. 606, 352, 353, 405), the three youngest dying. The mother and two remaining children of the family escaped; they were all vaccinated.

The houses newly invaded during this fortnight were situated in two districts only, viz. :—

3. South Hamlet - - -	21, with	51 cases.
4. St. John Baptist - - -	1 „	1 „

The *age*-incidence of the 52 cases was :—

1 month to 1 year - - -	1 case.	
1 to 10 years - - - -	22 „	5 deaths.
10 to 30 „ - - -	13 „	2 „
30 and over - - -	16 „	2 „
	52	9

There were removed to hospital 33, of whom 8 died.
Remained at home 19, of whom 1 died.

LIST OF HOUSES KNOWN TO BE INVADED BY SMALL-POX during the Fortnight ending February 15th, 1896.

[MAP 4.]

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
50	5, Napier Street -	III.	—	—	—	4	2	—	—	—	82	—
51	Sidney Villa, St. Paul's Road.	III.	—	—	—	—	—	—	—	—	—	83
52	34, Wellington Street	III.	—	—	—	1	3	—	—	—	85	—
53	58, Howard Street -	III.	—	—	—	—	—	—	—	—	—	*86*
54	2, Rose Villa, Albion Street.	III.	—	—	1	3	1	—	—	87	141	140
55	Quedgley Villa, Bristol Road.	III.	—	—	—	—	—	—	—	—	88	—
56	38, Moor Street -	III.	—	—	6	2	2	—	—	89, 173, 1,416, 1,670 *1,671*, 1,704	*101*, 330	—
57	42, Regent Street -	III.	—	—	—	2	2	—	—	—	—	*90*
58	1, Robin Hood Street	III.	—	1	4	—	2	—	—	180, 184	—	91, 322
59	28, Princes Street -	III.	—	—	—	—	—	—	—	—	92, 126	—
60	46, Castle Street -	III.	—	—	—	—	2	—	—	—	—	93, 177
61	"Tresilian," 40, Hanman's Road.	III.	—	1	—	2	1	—	104	—	97	—
62	6, Sunningdale Terrace, Linden Road.	III.	—	—	—	—	—	—	—	—	—	94
63	21, Stroud Road -	III.	—	—	1	7	2	—	—	—	95	—
64	— Upper Cecil Road	III.	—	—	5	1	2	—	—	96, 492, 493, 501, 1,094	—	494
65	1, Falkner Street -	III.	—	—	2	2	1	—	—	*98*	386	175
66	2, Clegram Villas -	III.	—	—	2	—	2	—	—	—	—	99, 170
67	6, Dynevor Square -	III.	—	—	3	3	2	—	—	*352*, *353*, *405*	656	100
68	4, George's Row, Morton Street.	III.	—	—	3	1	2	—	—	—	—	103
69	3, Raglan Street -	III.	—	—	3	—	2	—	—	105, 106, 115	—	143
70	63, Napier Street -	III.	—	—	3	1	2	—	—	107	—	—
71	7, Bedford Street -	IV.	—	—	3	4	2	—	—	—	*109*	—

V.

February 16*th to* 29*th*.—A most marked exacerbation of the disease occurred during this fortnight. In the week ending February 15th there had been nine cases, of which only four were in houses not previously invaded. Up to this date there had been, from June 1895, 71 houses invaded, and 79 cases known. But from this time onwards, for a period of four months, the weekly notifications were never less than 47, and, indeed, for eight weeks continued to increase progressively until, in the week ending April 11th, the highest number (211) was reached. During these four months, 980 houses were newly invaded, yielding 1,780 cases in all.

A striking feature of the notifications which occurred during this fortnight was the large proportion of children amongst them. Of 95 cases occurring in the 93 houses which were newly invaded, no fewer than 75 were of children under the age of 10 years, a remarkable preponderance even in an epidemic where children have suffered so extensively. The reason for this was the fact that the majority of them were infected at school, no fewer than 40 of the cases notified during this fortnight attending the Widden Street (Infants) school when attacked, and 25 the St. Luke's (Infants) school in New Street. I propose to enter subsequently into fuller detail upon the incidence of the disease in these schools, but it must suffice here to state that to this cause must undoubtedly be attributed the great dissemination of the disease within the city, and particularly in the quarters whence these children came, that now took place.

There were 114 cases known to have occurred during this fortnight, and 93 houses were newly invaded, in which 231 cases altogether arose, 77 being fatal:—

39 houses yielded each 1 case.
18 ,, ,, 2 cases.
15 ,, ,, 3 ,,
8 ,, ,, 4 ,,
8 ,, ,, 5 ,,

1 house yielded 6 cases.
2 „ „ 7 „
1 „ „ 8 „
1 „ „ 11 „

The larger proportionate number of houses having more than one case was in the main attributable to the greater incidence of the disease upon the children of the household.

The houses were located as follows :—

1. Kingsholm - - - -	10 houses,	29 cases.
3. South Hamlet - - -	80 „	192 „
4. St. John Baptist - - -	3 „	10 „

The *age*-incidence of the 231 cases was :—

1 month and under - -	1 case,	1 death.
1 „ to 1 year - -	9 „	8 „
1 to 10 years - - -	131 „	57 „
10 to 30 „ - - -	53 „	3 „
30 and over - - - -	37 „	8 „
	231	77

Of these there were removed to hospital 154, of whom 60 died.
Remained at home 77, of whom 17 died.

Reference may be made to three families amongst those attacked during this period. In No. 94 every one of a family of 11 members had the disease, which began in a child six years old, one of the Widden Street school children. The parents and five children, aged 11 to 17, were vaccinated, and none of these died, but each of the four younger children (from 6 months to 6 years) died; they had not been vaccinated. Another instance of the whole family being attacked is that of house No. 136. Here the parents (35 and 29 years) were the only ones vaccinated; the mother had a mild attack, the father a more severe one. A boy, 5 years old, the first to be taken ill, died; then twin infants (at 4 months); whilst two other children (4 years and 18 months respectively) recovered, the younger having a discrete attack only. In house No. 151 two children out of a family of seven escaped. They, like their parents, had been vaccinated, but both the latter (aged 34 and 32 years) died, as also did four out of the five remaining children (aged from 6 to 1 year); a girl of 8 recovered. These five children were all unvaccinated.

The tables and analysis given hereafter will show to what an extent the incidence of the disease in families fell upon the unvaccinated, but this is almost tantamount to saying that it was an incidence upon the children under 10 years of age, as so small a proportion of children of this class in Gloucester were vaccinated at the time of the outbreak.

List of Houses known to be invaded by Small-pox during the Fortnight ending February 29, 1896.

[Map 5.]

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
72	24, Salisbury Road -	III.	—	—	—	5	2	—	—	—	110	—
73	10, Twyver Street -	I.	—	—	—	2	2	—	—	—	111	—
74	5, Gothic Cottage, Barton Street.	III.	—	—	—	—	—	—	—	*112*	—	—
75	61, Lower Barton Street.	III.	—	—	4	1	2	—	—	*113*	—	—
76	14, Forest Terrace -	III.	—	1	2	3	3	—	*114*	—	—	231, *239*
77	20, Blenheim Road -	III.	—	1	2	1	1	—	—	*116*	—	238
78	11, Bienheim Road -	III.	—	—	4	1	2	—	—	117, 224	—	—
79	5, Seymour Road -	III.	—	—	—	—	—	—	—	—	118	—
80	49, Milbrook Street -	III.	—	—	—	—	—	—	—	119	—	—
81	3, Vauxhall Terrace, Milbrook Street.	III.	—	—	4	—	2	—	—	*120*, 1,845	—	—

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
82	132, Milbrook Street	I.	—	—	2	1	1	—	—	121, *232*	—	—
83	10, Napier Street -	III.	—	—	2	2	—	—	—	122, 217	216	—
84	3, Windsor Place, Milbrook Street.	III.	—	—	4	—	2	—	—	123	—	—
85	25, Victoria Street -	III.	—	—	2	2	2	—	—	*124*	—	—
86	163, Lower Barton Street.	III.	—	—	3	1	2	—	—	125	—	—
87	17, Upton Street -	III.	—	—	6	4	2	—	—	128, 129, 647	1,128	—
88	9, Lower Barton Street.	III.	—	—	1	4	3	—	—	130	—	—
89	55, Blenheim Road -	III.	—	—	2	2	1	—	—	131, 133	247	—
90	60, Milbrook Street -	III.		—	6	—	2	—	—	*132*	—	267
91	Yorkeley Villa, Alfred Street.	I.	—	—	3	3	—	—	—	*134*	—	—
92	38, Midland Road -	III.	—	—	—	3	2	—	—	—	136	—
93	Linden Road Board School.	III.	—	—	—	—	—	—	—	—	137	—
94	23, Twyver Street -	I.	—	1	3	5	2	—	*314*	*135*, *234*, *429*	235, 259, 260, 265, 266	236, 268
95	77, Milbrook Street -	I.	—	—	3	2	—	—	—	138	—	—
96	30, Widden Street -	III.	—	—	4	3	2	—	—	*139*, 230, 993	567, 991	—
97	29, Widden Street -	III.	—	—	2	4	2	—	—	142, 341	—	—
98	46, Stratton Road -	III.	—	—	—	—	—	—	—	144, 242, *258*	257	241
99	"Beehive," Milbrook Street.	III.	—	—	4	3	1	—	—	145, 245	351	246
100	8, Jersey Road -	III.	—	—	3	—	2	—	—	*146*	—	—
101	6, Lady-bellgate -	IV.	—	—	4	2	2	—	—	*147*, *261*, *263*	262	—
102	32, Sinope Street -	III.	—	—	1	2	—	—	—	148	1,214	—
103	5, Wellington Street	III.	—	—	3	—	3	—	—	—	—	149
104	38, Falkner Street -	III.	—	—	—	2	2	—	—	—	*150*	317
105	Granville Terrace, Alfred Street.	I.	—	—	4	3	2	—	—	*151*, 152	—	—
106	46, Lower Barton Street.	III.	—	1	1	1	3	—	*284*	*153*	—	274
107	90, Alma Place -	III.	—	1	4	2	—	—	*1,739*	1,555, 1584	154	—
108	40, Sinope Street -	III.	—	1	2	1	1	—	—	*155*	283	1,956
109	25, Widden Street -	III.	—	—	3	5	2	—	—	*156*, *255*, 256	—	—
110	75, Falkner Street -	III.	—	—	2	5	2	—	—	157	303	—
111	50, East End Road -	I.	—	1	4	1	2	—	—	158	—	—
112	100, Alma Place -	III.	—	—	2	2	—	—	—	196	160, 210	—
113	"Robin Hood," Hopewell Street.	III.	—	1	3	1	5	—	*643*	*159*, 466, 479	—	*291*, 644
114	23, Magdala Terrace	III.	—	—	2	—	3	—	—	*161*	—	—
115	13, Jersey Road -	III.	—	—	1	—	3	—	—	*162*	—	—
116	94, Lower Barton Street.	III.	—	—	3	3	1	—	—	163, 575	576, 737	—
117	59, Vauxhall Road -	III.	—	—	2	1	2	—	—	164, 583	582	243
118	27, Vauxhall Road -	III.	—	—	3	2	2	—	—	165	414, *415*	—
119	37, Victoria Street -	III.	—	1	2	3	—	—	—	*166*	286, 584	—
120	27, Magdala Road -	III.	—	—	3	—	4	—	—	167	—	278
121	Tweenbrook Villa -	III.	—	—	—	—	—	—	—	—	—	168
122	3, Forest Terrace -	III.	—	—	2	3	3	—	—	*273*, *555*	169, 556, 557	—
123	41, Twyver Street -	I.	—	—	4	2	3	—	—	171, 440, 747	873, 874	—
124	16, Barton Terrace -	III.	—	—	—	—	2	—	—	—	—	*172*
125	35, Stroud Road -	III.	—	1	5	5	2	—	*820*	*174*, 1,142, *1,247*, 827	—	—
126	58, Clifton Road -	III.	—	—	—		—	—	—	*176*	—	—
127	Fernlea Villa, Seymour Road.	III.	—	—	3	4	1	—	—	*178*	—	—
128	26, Napier Street -	III.	—	—	1	1	1	—	—	—	—	179
129	15, Llandilo Street -	III.	—	—	—	—	—	—	—	181, 451, *452*	—	346, 672
130	7, Theresa Street -	III.	—	—	—	—	—	—	—	182	—	—
131	44, Napier Street -	III.	—	—	—	—	—	—	—	183	—	*591*, *836*
132	49, Theresa Street -	III.	—	—	4	1	1	—	—	185, *318*	—	—
133	61, Theresa Street -	III.	—	—	—	—	—	—	—	*186*	301	—
134	37, Howard Street -	III.	—	—	—	3	2	—	—	—	187	—
135	39, New Street -	III.	—	—	—	—	—	—	—	*188*	—	—
136	46, Alma Place -	III.	—	2	3	1	1	—	*323*, *324*	*189*, 327, 401	325	400
137	St. Luke Street -	III.	—	—	3	1	2	—	—	*190*	—	—
138	4, Somerset Place -	III.	—	1	4	1	2	—	—	191	—	390
139	91, New Street -	III.	—	—	3	2	—	—	—	*192*	—	—
140	48, Robin Hood Street	III.	—	1	5	2	2	—	364	*193*, 413, 693, 694, 1,161	384	365
141	60, Robin Hood Street	III.		—	3	2	—	—	—	*197*	—	—

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
142	85, New Street -	III.	—	—	4	4	1	—	—	*194*	340, 354, 791	—
143	114, Alma Place -	III.	—	—	3	2	2	—	—	195, 380, 382	1,121	378
144	113, New Street -	III.	—	—	3	2	2	—	—	*198*	—	—
145	Florence Villa, St. Paul's Road.	III.	—	—	6	5	2	—	—	*201*	199	—
146	42, Sherborne Street	IV.	—	—	3	3	2	—	—	200, 355, 673	319, 437	—
147	47, Victoria Street -	III.	—	—	2	2	1	—	—	202, *430*	—	—
148	62, Victoria Street -	III.	—	—	—	2	3	—	—	—	203, *971*	481
149	32, Robin Hood Street	III.	—	1	2	—	2	—	—	*204*	—	422, 423
150	Oxford Terrace, London Road.	I.	—	—	3	3	2	—	—	205, *478*, 514	—	—
151	63, Brook Street -	III.	—	—	6	1	2	—	—	*206*, *335*, 424, *425*, *426*	—	*310*, *339*
152	120, New Street -	III.	—	—	4	5	2	—	—	*207*	439	421
153	65, New Street -	III.	—	—	—	—	—	—	—	208	—	—
154	67, Regent Street -	III.	—	—	1	—	3	—	—	—	—	209
155	43, Theresa Street -	III.	—	—	—	—	—	—	—	211	—	—
156	11, Somerset Place -	III.	—	—	3	4	2	—	—	*212*	—	*403*
157	70, Sherborne Street	IV.	—	—	—	4	3	—	—	—	—	213
158	12, Napier Street -	III.	—	—	1	—	3	—	—	—	—	214
159	49, Alma Place -	III.	—	—	4	4	—	—	—	*215*, 498	499	—
160	Clare Terrace, Clegram Road.	III.	—	—	2	4	2	—	—	218	—	—
161	49, Robin Hood Street	III.	1	—	3	1	2	*954*	—	*219*, 698, 953	—	—
162	60, New Street -	III.	—	—	5	2	2	—	—	220	—	—
153	20, East End Road -	I.	—	—	4	—	2	—	—	*221*, *222*	—	—
164	9, Dainty Street -	III.	—	—	2	2	—	—	—	—	223	—

VI.

March 1st to March 14th.—The epidemic had now assumed such proportions as to be no longer under the control of the sanitary authority. Up to this time nearly every case had been removed to hospital as it arose, and the infected house supervised, the inmates being kept "in quarantine" for 14 days after the removal of the case. But the hospital accommodation had been strained to its utmost; and although the further opening of wards in the unsuitable "cholera hospital" at Hempsted allowed slight relief, yet even this additional accommodation was soon overpassed. As the great majority of the cases were those of children, several of the hospital wards contained more than their allowance of beds. It was, however, of no avail; and, although had the epidemic then abated, the efforts to isolate every case would have been perhaps justified by events, these very efforts resulted in the creation of a feeling of mistrust of hospital treatment, which increased the numbers of those who preferred to remain in their homes after the necessity for their so remaining had passed away.

To this fact, that a large and increasing proportion of cases were retained in their homes, must be ascribed in great measure the continued spread of the disease. Certain localities became especially affected, notably such streets as Alma Place, off the Bristol Road; New Street, off the Stroud Road; Castle Street, to the east of the hospital, and numerous small and thickly peopled streets in the Tredworth district.

The question of aerial infection from the crowded hospital might also be invoked to explain the continuance of the outbreak; but the facilities for contagion, through direct inter-communication of neighbouring families, afford a simpler and possibly a truer reason. It is probable, also, that some of the other schools, referred to later, may have contributed to the spread of infection, until, by the middle of March, they had all been closed by the sanitary authorities.

During this fortnight 207 cases were known to have arisen, and 118 houses were newly invaded. These houses ultimately yielded 257 cases, of which 55 were fatal, a much smaller fatality than occurred amongst the households infected in the preceding fortnight, when so large a proportion of children were attacked.

Of these 118 houses, there were—

58	houses	yielding	1	case.
30	„	„	2	cases.
12	„	„	3	„
6	„	„	4	„
5	„	„	5	„
3	„	„	6	„
1	„	„	7	„
1	„	„	8	„
1	„	„	9	„
1	„	„	12	„

Again, a few may be selected as examples of the extent to which some families suffered.

House 170.—The first to be attacked was a child of 4 years; she had a confluent attack; then the parents, the father (unvaccinated) dying. Of the three remaining children, an infant died and a girl of 6 had a discrete attack. The mother was the only vaccinated member of the family.

House 189.—The child first to be attacked (infected at school?) died, as did also the mother (aged 28) and two children (7 months and 6 years); one child (No. 513), the only vaccinated member of the family, escaping with a mild attack.

House 194.—Here the father was the only member of a family of 10 who escaped infection. The mother and three elder children (aged 10, 12, 14), who were all vaccinated, escaped with mild attacks; whilst the five younger unvaccinated children (15 months to 9 years) all died.

House 244.—A family of seven, all attacked; the parents had mild attacks; the children (9 months to 5 years) confluent, three dying. The children were unvaccinated. None of these cases was removed to hospital.

House 246.—In the East End Road, a street to the north of the Great Western Railway, and surrounded by fields; there had been two houses in this street previously invaded. This house contained seven inmates, all of whom were vaccinated; six were attacked with small-pox, the worst case only being removed to hospital.

House 272.—In this house each of the 12 inmates was attacked, all remaining at home. The father (aged 53), vaccinated, died; as also did an unvaccinated infant and a girl of 17, whose "vaccination never took," although attempted three times (No. 590). Another daughter (No. 587) showed no marks of vaccination on her arm, and hers was the only other confluent attack in the household. Two young children (3 and 2 years) who were vaccinated at and just before their illness had mild attacks.

The houses invaded during this fortnight were situated in :—

1. Kingsholm	- - -	2 houses,	7 cases.
2. St. Nicholas	- - -	3 „	6 „
3. South Hamlet	- - -	111 „	241 „
4. St. John Baptist	- - -	2 „	3 „
		118	257

LIST OF HOUSES KNOWN TO BE INVADED BY SMALL-POX during the Fortnight ending March 14th, 1896.

[MAP 6.]

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
165	22, Llanthony Road -	III.	—	—	5	—	2	—	—	*225*, 226 *528*	—	—
166	23, Alvin Street -	IV.	—	—	1	2	1	—	—	—	227	—
167	1, Regent Street -	III.	—	—	1	2	1	—	—	—	228	—
168	2, New Street - -	III.	1	—	4	2	2	—	—	229	*446*	—
169	20, Pembroke Street	III.	—	—	1	1	3	—	—	—	233	—
170	51, Castle Street -	III.	—	1	3	—	2	—	*463*	237, 721, 758	—	*462*, 464

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
171	Llanthony Cottages -	III.	1	—	4	3	2	856	—	240	—	480
172	28, Robin Hood Street	III.	—	—	1	3	2	—	—	—	244, 472	—
173	75, Victoria Street -	III.	—	—	3	1	2	—	—	248	—	—
174	14, Widden Street -	III.	—	—	3	2	2	—	—	—	249	—
175	Clarence Villa, Seymour Road.	III.	—	—	4	—	2	—	—	250	—	—
176	33, Melbourn Street -	III.	—	—	3	4	2	—	—	—	251	—
177	Clare Terrace, Clegran Road.	III.	—	—	1	1	1	—	—	—	547	252
178	23, Dineley Street -	III.	—	—	3	2	2	—	—	—	—	*253*
179	35, Upton Street -	III.	—	—	4	1	1	—	—	—	—	254
180	56, Adelaide Street -	III.	—	—	—	—	—	—	—	—	*264*	—
181	28, Clifton Road -	III.	—	1	2	2	2	—	*1,169*	269, 553	—	—
182	16, Castle Street -	III.	—	1	3	6	2	—	*715*	570, 700, *828*	270, 571	—
183	30, New Street -	III.	—	—	—	—	—	—	—	—	271	—
184	7, Sydenham Terrace	III.	—	—	4	3	2	—	—	448	—	*272*
185	11, Wellington Street	III.	—	—	—	—	—	—	—	—	—	*275*
186	23, Linden Road -	III.	—	2	1	2	—	—	*276*	—	633	—
187	21, New Street -	III.	—	—	—	1	1	—	—	—	277	634
188	9, Pembroke Street -	III.	—	—	—	8	2	—	—	—	279	—
189	41, Alma Place -	III.	—	1	3	1	—	—	*280*	*511*, 513, *515*	*512*	—
190	9, Falkner Street -	III.	—	—	—	2	3	—	—	—	—	281
191	34, Morton Street -	III.	—	—	1	3	2	—	—	—	282	—
192	28, Morton Street -	III.	—	—	—	4	—	—	—	—	285, 1,126, 1,525, 1,539	—
193	100, Falkner Street -	III.	—	—	—	2	—	—	—	—	287	—
194	13, Morton Street -	III.	—	—	5	3	2	—	—	*288*, *537*, *538*, *539*, *669*	540, 541, 585	542
195	19, Philip Street -	III.	—	1	5	2	2	—	—	624, *665*, 666	289, 534	—
196	11, Vauxhall Road -	III.	—	—	—	—	4	—	—	—	—	290
197	Farnbrook Terrace, Bates Lane.	I.	—	—	—	—	—	—	—	—	292	—
198	16, Millbrook Street	III.	—	1	4	—	2	—	—	293	—	—
199	63, Howard Street -	III.	—	—	2	2	4	—	—	—	—	294
200	36, Conduit Street -	III.	—	—	—	—	—	—	—	—	295	—
201	Cricklade Terrace, Hanman's Road.	III.	—	—	—	3	1	—	—	—	296	—
202	6, Morningside, Linden Road.	III.	—	—	5	1	2	—	—	—	—	297
203	3, St. Paul's Road -	III.	—	1	3	—	2	—	695	—	—	298
204	24, Regent Street -	III.	—	—	1	7	3	—	—	—	—	299
205	P. O. Bristol Road -	III.	—	—	—	—	—	—	—	—	—	300
206	5, Morpeth Street -	III.	—	—	—	—	—	—	—	—	—	302
207	High Orchard Street	III.	—	—	—	—	—	—	—	304, 328	329	—
208	15, Tredworth Road	III.	—	—	—	—	—	—	—	*305*	—	620
209	Winifred Villas, Melbourn Road.	III.	—	—	4	—	1	—	—	306, 307	—	—
210	10, Exhibition Street	III.	—	—	2	3	2	—	—	—	*308*	—
211	30, Castle Street -	III.	—	—	—	—	—	—	—	—	—	309
212	54, Vauxhall Road -	III.	—	—	—	3	2	—	—	—	—	*311*
213	1, Carmarthen Street	III.	—	—	3	2	—	—	—	*428*	312	
214	13, Upton Street -	III.	—	—	—	—	—	—	—	—	—	313
215	1, Magdala Terrace	III.	—	1	—	2	1	—	—	—	315, 619	—
216	3, Linden Terrace -	III.	—	—	3	1	1	—	—	316, 648	—	—
217	"Ellesmere," Parkend Road.	III.	—	—	—	—	—	—	—	—	320	—
218	16, Morpeth Street -	III.	—	—	—	3	2	—	—	—	326, 579, 580	—
219	35, Theresa Street -	III.	—	—	—	—	—	—	—	—	331	—
220	41, Rycroft Street -	III.	—	—	3	2	2	—	—	*1,013*, 1,195	898	332
221	48, Alma Place -	III.	—	—	6	1	1	—	—	*860*	333	861
222	3, Alfred Street -	III.	—	—	—	1	2	—	—	—	*334*	—
223	65, Blenheim Road -	III.	—	—	—	2	1	—	—	—	336, 992	—
224	30, Morpeth Street -	III.	—	—	2	—	3	—	—	—	—	337
225	3, Seymour Road -	III.	—	—	2	2	—	—	—	706	338, *707*	—
226	11, Stratton Road -	III.	—	—	—	1	2	—	—	—	342	—
227	72, Alma Place -	III.	—	—	—	—	—	—	—	—	—	343
228	88, Alma Place -	III.	—	—	2	2	—	—	—	—	344	—
229	61, Bristol Road -	III.	—	—	—	1	4	—	—	—	—	*345*, 699
230	20, Brook Street -	III	—	—	—	3	2	—	—	—	347	—
231	55, Barton Terrace -	III.	—	—	1	3	2	—	—	—	—	348
232	68, Robin Hood Street	III.	—	1	1	3	—	—	*607*	—	349	—
233	3, Castle Street -	III.	—	—	—	1	2	—	—	—	350	—
234	Elm Villa, Falkner Street.	III.	—	—	—	1	4	—	—	—	—	356
235	20, Cecil Road -	III.	—	—	1	2	1	—	—	*357*	638	637
236	1, Vauxhall Road -	III.	—	—	—	—	—	—	—	358	—	—
237	9, Forest Terrace -	III.	—	—	1	—	2	—	—	359	—	729, 786
238	3, Morningside, Linden Road.	III.	—	—	3	1	1	—	—	—	—	360
239	10, Matson Place -	III.	—	1	—	2	2	—	*802*	—	361, 725	727

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
240	Stephens Court, Westgate.	II.	—	—	—	—	—	—	—	603, *703*	—	362
241	1, Theresa Street -	III.	—	—	2	3	—	—	—	*1,656*	*363*	—
242	20, Philip Street -	III.	—	—	3	1	1	—	—	*366*	662	—
243	26, Robin Hood Street	III.	—	—	—	2	1	—	—	—	690	367
244	10, Melbourn Street	III.	—	1	4	—	2	—	368	*524, 525* *526, 527*	—	530, 701
245	128, High Street -	III.	—	—	—	1	2	—	—	—	370	—
246	39, East End Road -	I.	—	—	—	4	3	—	—	—	369, 600, 628, 631	629, 741
247	165, Lower Barton Street.	III.	—	—	—	4	1	—	—	—	371	—
248	14, Robin Hood Street	III.	—	1	2	—	2	—	—	780	—	372
249	2, Magdala Terrace -	III.	—	—	2	2	1	—	—	—	373	1,929
250	4, Raglan Street -	III.	—	—	1	2	—	—	—	*1,130*	374, 803	—
251	39, Alma Place -	III.	—	1	3	3	2	—	1,190	862, 1,189, *1,329*	818, 1,246	375, 824
252	34, Hopewell Street -	III.	—	—	2	—	3	—	—	*376*, 697	—	605, 708
253	12, Sunningdale Terrace, Linden Road.	III.	—	1	3	—	2	—	670	—	—	377
254	Hillview Terrace, Cecil Road.	III.	—	—	—	—	—	—	—	—	—	379
255	10, Morpeth Street -	III.	—	—	1	2	2	—	—	—	—	381
256	29, Robin Hood Street	III.	1	—	3	2	2	*383*	—	—	—	398
257	17, Robin Hood Street	III.	—	—	2	—	2	—	—	—	—	385, 1,455
258	12, Philip Street -	III.	—	—	4	2	2	—	—	—	—	387
260	111, New Street -	III.	—	—	—	—	4	—	—	—	—	389, *768*
261	62, Salisbury Road -	III.	—	—	—	—	—	—	—	—	391	—
262	56, Sebert Street -	II.	—	—	—	2	—	—	—	—	392	—
263	24, Alvin Street -	IV.	—	—	—	—	—	—	—	—	393, 535	—
264	15, Cecil Road -	III.	—	—	—	—	2	—	—	—	—	394
265	52, Alma Place -	III.	—	—	2	2	2	—	—	*717, 823*	395, 822	720
266	Woodbine Cottage, Linden Road.	III.	—	—	3	1	1	—	—	396, 718, 719	716	—
267	53, Castle Street -	III.	—	—	—	—	2	—	—	—	—	*397*
268	30, Philip Street -	III.	—	—	—	4	1	—	—	—	399, 402	—
269	47, Hopewell Street -	III.	—	—	5	—	3	—	—	—	—	404, 667
270	8, Conduit Street -	III.	—	—	—	1	2	—	—	—	406	—
271	46, Wellesley Street	III.	—	—	4	—	2	—	—	407	—	686
272	22, St. James' Street	III.	—	1	2	4	5	—	*610*	635, 636	587, *590*, 609, 632	*408*, 586, 687, 709, 726
273	41, Ducie Street -	III.	—	—	4	1	2	—	—	—	—	409
274	68, Brook Street -	III.	—	—	—	5	—	—	—	—	410, 754	—
275	51, New Street -	III.	—	—	3	2	1	—	—	411, 543, 793	—	—
276	102, Alma Place -	III.	—	—	1	6	2	—	—	1,607	412, 671, 1,127	1,253
277	Sidney Villa, Widden Street.	III.	—	—	3	2	—	—	—	—	416	—
278	Clegram Villas -	III.	—	—	—	4	2	—	—	—	*417*	—
279	14, Philip Street -	III.	—	—	—	2	2	—	—	—	—	418
280	2, Tredworth Road -	III.	—	—	—	3	4	—	—	—	419, 750	652, 661, 749
281	12, Albert Street -	III.	—	—	2	2	1	—	—	734, 799	420, 674	—
282	Prospect House Conduit Street.	III.	—	1	5	5	2	—	—	—	427	—
283	23, Lower Westgate Street.	II.	—	—	—	—	—	—	—	476	—	431

The *age*-incidence of the cases occurring in these houses was :—

1 month and under - -	2 cases,	1 death.
1 month to 1 year - - -	12 ,,	8 ,,
1 to 10 years - - -	73 ,,	28 ,,
10 to 30 years - - -	96 ,,	9 ,,
30 and over - - -	74 ,,	9 ,,
	257	55

Thus the age-incidence shows a tendency to shift towards the adult period of life, but there is still a large preponderance of fatal cases amongst young children.

Of these 257 cases there were removed to hospital 94, of whom 24 died.

Remained at home 163, of whom 31 died.

VII.

March 15*th to March* 28*th.*—The disease continued to spread during this fortnight, there being 307 fresh cases, and 138 houses newly invaded. In these houses there occurred altogether 300 cases of small-pox, of which 72 were fatal :—

73 houses yielded 1 case.
24 ,, ,, 2 ,,
12 ,, ,, 3 ,,
11 ,, ,, 4 ,,
11 ,, ,, 5 ,,
5 ,, ,, 6 ,,
2 ,, ,, 7 ,,

House 303.—Here there was a family of 12 ; 4 of the children (unvaccinated), aged from 5 to 8, having confluent attacks, 2 of which were fatal. These cases were left at home, but there was no further infection. The remaining 8 members had been vaccinated in infancy.

House 307.—Here all (5) were attacked, and all but 1 removed to hospital ; 2 were unvaccinated, the rest vaccinated.

House 316.—All attacked, and all left at home ; 3 died, 2 unvaccinated, at 4 and 8 and an infant 3 months old, vaccinated 5 days before onset of symptoms. The parents and the remaining child attacked were vaccinated in infancy.

House 332.—All the children, 5 in number attacked, ages from 7 to 12 years ; they were unvaccinated, and their attacks were severe, 1 fatal (aged 11).

House 337.—All the children (4) attacked, 2 dying ; 3 of them, including 1 of the fatal cases, had been vaccinated at the time of their illness.

House 356.—A family of 8 in a small house ; 4 unvaccinated children (8, 5, 3, and 14 months) attacked, one dying (aged 3) ; another child, aged 14, had a mild attack, he had been vaccinated in infancy, as also had the mother, who died from malignant small-pox. These cases were left at home, but two of the family (vaccinated) escaped.

I may state here that it was a common practice for some of the wage-earners of a family to leave the house when small-pox appeared in it, and the cases had to be left at home. My impression that a larger number of the mothers were attacked than of fathers may thus be accounted for.

House 358.—A family of 8, 5 of whom attacked. At the time of the first case occurring the hitherto unvaccinated children were vaccinated, but 3 out of the 4 sickened within a few days ; 2 of them died. These cases were all removed to hospital.

House 395.—Five in family, all attacked, 4 being unvaccinated children under 10 years of age, of whom 2 died.

House 391.—Six cases out of 7 in family (inclusive of an infant born during its mother's illness). Both parents (vaccinated) died as well as this infant ; but 3 children (aged 2 to 5), who were vaccinated a week before the arrest of symptoms, had discrete and mild attacks.

These (138) houses were thus distributed in the districts :—

1. Kingsholm - -	4 houses,	7 cases.
3. South Hamlet - -	130 ,,	287 ,,
4. St. John the Baptist -	4 ,,	6 ,,

The *age*-incidence of those attacked in these houses was :—

1 month and under - -	7 cases,	7 deaths.
1 ,, to 1 year - -	9 ,,	6 ,,
1 to 10 years - - -	108 ,,	36 ,,
10 to 30 years - - -	98 ,,	11 ,,
30 and over - - -	78 ,,	12 ,,
	300	72

Of these cases there were removed to hospital 66, of whom 17 died.
Remained at home 234, of whom 55 died.

List of Houses known to be invaded by Small-Pox during the Fortnight ending March 28th, 1896.

[Map 7.]

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
284	Hanman's Terrace, Parkend Road.	III.	—	—	—	—	—	—	—	—	—	432
285	13, Sydenham Terrace.	III.	—	—	—	3	2	—	—	—	—	433, *915*
286	34, Alma Place	III.	—	1	—	2	—	—	—	—	434, 857	—
287	61, Napier Street	III.	—	—	2	1	1	—	—	*435*	—	—
288	34, Sinope Street	III.	—	1	—	1	1	—	*1,050*	—	436	—
289	48, Nelson Street	III.	—	1	3	2	2	—	*920*	891, 895, *897*.	438, 896	—
290	Thornmead Villa, Seymour Road.	III.	—	—	—	2	2	—	—	—	441	—
291	60, Victoria Street	III.	—	—	—	2	1	—	—	—	443, 765	—
292	12, Rycroft Street	III.	—	—	—	—	2	—	—	—	—	442
293	11, Clifton Road	III.	—	—	1	3	1	—	—	*731*	444	728
294	21, Sinope Street	III.	—	—	1	5	1	—	—	445	714, 759, 1,251.	—
295	"Northernhay," St. Paul's Road.	III.	—	—	2	3	2	—	—	—	447	1,233
296	5, Castle Street	III.	—	—	—	2	2	—	—	—	—	449, 804
297	41, Theresa Street	III.	1	—	4	1	1	*955*	—	450, 916	*752*	—
298	7, Union Street	IV.	—	—	—	—	—	—	—	—	453, *782*	—
299	25, New Street	III.	—	—	3	—	1	—	—	455, 456, 457.	—	454
300	98, New Street	III.	—	—	—	—	—	—	—	—	—	458
301	24, Wellesley Street	III.	—	1	2	1	2	—	*777*	*459*, 776	—	738, 796
302	5, New Street	III.	—	—	—	—	2	—	—	—	—	460
303	58, Stratton Road	III.	—	—	5	5	2	—	—	461, *880*, *881*, 932.	—	—
304	2, Knowles Road	III.	—	—	3	1	2	—	—	*654*	710	465
305	38, Howard Street	III.	—	—	2	—	2	—	—	467	—	—
306	19, Sydenham Terrace.	III.	—	—	—	—	2	—	—	—	—	*468*
307	25, India Road	III.	—	—	1	3	1	—	—	1,002	469, 751, 852.	913
308	Grove Villa, Seymour Road.	III.	—	—	—	—	—	—	—	*470*	—	—
309	42, Wellington Street	III.	—	—	—	1	2	—	—	—	—	471
310	13, Stratton Road	III.	—	—	3	4	2	—	—	—	473	—
311	Lorraine Villa, Weston Road.	III.	—	—	2	2	1	—	—	—	474	—
312	15, St. Paul's Road	III.	—	—	—	2	2	—	—	—	—	475
313	26, Morton Street	III.	1	—	3	3	2	*676*	—	*477*, 1,193	1,519	—
314	11, Nelson Street	III.	—	—	4	—	2	—	—	482	—	—
315	2, Castle Street	III.	—	—	—	—	2	—	—	—	—	483
316	17, Castle Street	III.	—	1	2	1	2	—	*829*	*484*, *642*	830	649, 650
317	18, Barton Terrace	III.	—	—	—	2	—	—	—	—	485, 735	—
318	48, Widden Street	III.	—	—	6	—	2	—	—	486, 851	—	848, 850
319	65, Regent Street	III.	—	—	1	3	3	—	—	487	—	—
320	4, Daventry Terrace	III.	—	1	—	2	—	—	996	—	488, 997	—
321	2, Hanman's Road	III.	—	1	5	3	2	—	—	489	—	—
322	62, Eastend Road	III.	—	—	2	3	2	—	—	744, 321	—	490
323	49, Hopewell Street	III.	—	—	—	—	—	—	—	*491*	—	—
324	19, Victory Road	III.	—	—	4	—	3	—	—	495, *894*, 1,123.	—	892, 893
325	26, Theresa Street	III.	—	—	—	3	—	—	—	—	496, 497	—
326	42, Philip Street	III.	—	—	—	—	—	—	—	—	500	—
327	27, New Street	III.	—	—	1	—	2	—	—	*502*	—	—
328	9, Melbourn Street	III.	—	—	2	2	—	—	—	—	503	—
329	81, Regent Street	III.	—	—	2	4	1	—	—	—	504	—
330	6, Napier Street	III.	—	—	—	3	1	—	—	—	*505*	—
331	Painswick Road, Crossing Cottage.	III.	—	—	2	1	2	—	—	*506*	—	—
332	22, Carmarthen Street	III.	—	—	2	3	2	—	—	760, 900	507, *901*, 902.	—
333	36, Adelaide Street	III.	—	—	1	—	2	—	—	508	—	—
335	20, Morpeth Street	III.	—	—	1	3	1	—	—	*516*	—	—
336	17, Weston Road	III.	—	—	—	2	2	—	—	—	517	—
337	10, Dainty Street	III.	—	1	3	—	1	—	1,089	*518*, *868*, 871.	—	—
338	7, New Street	III.	—	1	1	4	—	—	1,367	1,498	520, 835, 1,368.	—
339	26, Vauxhall Road	III.	—	—	—	—	2	—	—	—	—	521
340	Fowey Villa, Conduit Street.	III.	—	—	—	—	—	—	—	—	522	—
341	31, St. Paul's Road	III.	—	—	2	6	2	—	—	—	523, 1,014, 1,078.	—
342	51, Tredworth Road	III.	—	—	1	3	1	—	—	529	1,369	*842*
343	23, St. Mark's Street	IV.	—	—	—	—	2	—	—	—	—	531

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
344	5, Vauxhall Road -	III.	—	—	—	1	2	—	—	—	—	532, 987
345	16, New Street -	III.	—	—	4	1	2	—	—	*533*	—	—
347	106, Southgate Street	III.	—	—	1	4	—	—	—	—	*544*	—
348	Seymour Road -	III.	—	—	—	2	1	—	—	—	546	—
349	7, Archibald Street -	III.	—	—	—	1	1	—	—	—	903	545
350	29, Sinope Street -	III.	—	—	1	4	1	—	—	—	548	—
351	40, Bristol Road -	III.	—	—	—	—	—	*550*	—	—	549	—
352	2, Wellesley Street -	III.	—	—	1	4	2	—	—	—	—	551
353	Llanthony Road -	III.	—	—	—	6	2	—	—	—	552	—
354	37, Melbourn Street	III.	—	—	—	—	—	—	—	—	—	554
355	110, Lower Barton Street.	III.	—	—	—	—	—	—	—	—	—	558
356	7, Alma Terrace -	III.	—	—	4	2	2	—	—	*559*, 561, 563, 819.	588	*621*
357	27, Melbourn Street	III.	—	—	2	1	2	—	—	883	—	560, 1,540
358	10, Jersey Road -	III.	—	—	5	2	1	—	—	562, *815*, *837*, 884.	906	—
359	1, Victoria Cottages, Barton Street.	III.	—	—	—	—	—	—	—	564, 863	—	—
360	44, Tredworth Road	III.	—	—	—	1	2	—	—	—	565	797
361	75A, Falkner Street	III.	—	—	—	2	1	—	—	—	566	1,065
362	65, Howard Street -	III.	—	—	1	1	2	—	—	—	*568*	966, *1,342*
363	11, Sydenham Terrace.	III.	—	—	—	4	2	—	—	—	569	—
364	11, Grove Street -	III.	—	—	4	—	2	—	—	1,765	—	572
365	8, Milbrook Street -	III.	—	—	—	—	2	—	—	—	—	573
366	12, New Street -	III.	—	—	4	4	—	—	—	*574*	958	—
368	113, Rycroft Street -	III.	—	—	—	—	—	—	—	—	—	577
369	21, Tredworth Road	III.	1	—	4	1	2	*1,080*	—	578	882	1,079
370	16, Melbourn Street	III.	—	1	1	2	—	—	*914*	—	581	—
371	54, Moor Street -	III.	—	—	1	2	2	—	—	—	677, 733	1,249
372	Falcon Villa, Jersey Road.	III.	—	—	—	3	1	—	—	—	589	—
373	Cricklade Terrace, Hanman's Road.	III.	—	—	—	7	1	—	—	—	593	—
374	1, Paul Street -	III.	—	1	2	2	—	—	—	*592*	—	—
375	57, Worcester Street	IV.	—	—	—	1	3	—	—	—	—	594
376	43, Stroud Road -	III.	—	—	3	3	1	—	—	596	595	911
377	47, Blenheim Road -	III.	—	—	—	2	—	—	—	—	597	—
378	226, Lower Barton Street.	III.	—	—	—	1	1		—	—	598	—
379	3, Dineley Street -	III.	—	—	—	—	—	—	—	—	—	*599*
380	6, Castle Street -	III.	—	—	1	2	2	—	—	601	—	—
381	19, Archibald Street	III.	—	—	—	2	2	—	—	—	—	602
382	4, Napier Street -	III.	—	—	1	2	2	—	—	*604*	—	—
383	38, Vauxhall Road -	III.	—	—	1	1	1	—	—	*606*	—	—
384	22, Alfred Street -	III.	—	—	1	2	1	—	—	—	—	608
385	37, Derby Road -	III.	—	—	—	5	2	—	—	—	611	—
386	19, Grove Street -	III.	—	—	—	—	2	—	—	—	—	612, 613
387	26, St. James' Street	III.	—	—	2	1	2	—	—	—	—	614
388	86, Milbrook Street -	I.	—	—	2	5	3	—	—	—	615	—
389	5, Forest Terrace -	III.	—	—	3	2	2	—	—	618, 867, 963.	616, 965	964
390	4, Stroud Road -	III.	—	—	—	2	1	—	—	—	617	—
391	50, Robin Hood Street.	III.	1	—	3	1	2	*623*	—	952, 1,009, 1,010.	*622*	*951*
392	2, Lady-bellgate -	IV.	—	—	3	2	3	—	—	625	—	—
393	36, Rycroft Street -	III.	—	—	2	1	2	—	—	1,958	—	626
394	35, Sidney Street -	I.	—	—	—	1	2	—	—	—	—	627, 973
395	37, Victory Road -	III.	—	—	4	1	—	—	—	*630*, *655*, 657, 659.	660	—
396	54A, Moor Street -	III.	—	—	—	—	—	—	—	—	639	—
397	58, Castle Street -	III.	—	—	3	2	2	—	—	640, *736*, 833.	641, 832	—
398	4, Alfred Street -	III.	—	—	—	1	1	—	—	—	645	—
399	Mace's Buildings, Cecil Road.	III.	—	—	—	—	2	—	—	—	—	*646*
400	7, Baker Street -	III.	—	—	3	6	1	—	—	1,173, 1,515 1,516.	651, 1,174, 1,285, 1,517	—
401	26, New Street -	III.	—	—	2	3	—	—	—	722, 724	653, 678, 723.	—
402	54, Robin Hood Street.	III.	—	—	4	3	2	—	—	—	—	658
403	15, Rycroft Street -	III.	—	—	4	1	2	—	—	*664*	*663*	—
405	42, Melbourn Street	III.	—	—	3	1	2	—	—	1,117, 668	—	1,110, 1,326
406	9, Vauxhall Road -	III.	—	—	—	1	3	—	—	—	—	675
407	41, Barton Terrace -	III.	1	—	2	2	3	*826*	—	794, *1,269*	*679*	1,315
408	25, Melbourn Street	III.	—	—	1	—	2	—	—	*681*	—	—
409	24, Carmarthen Street	III.	1	—	4	2	2	*1,331*	—	683, 1,184, 1,185, 1,270	692, 1,111	—
410	41, Morton Street -	III.	—	—	1	1	3	—	—	*684*	—	1,145, 1,266
411	41, Stroud Road -	III.	—	1	6	3	2	—	*689*	685	—	—
412	29, Victoria Street -	III.	—	—	—	2	2	—	—	—	682	688, 1,069
413	152, Lower Barton Street.	III.	—	—	2	7	2	—	—	—	691	—

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
414	35, Magdala Road	III.	—	—	—	1	1	—	—	—	—	696
416	43, Ducie Street	III.	—	—	3	2	1	—	—	702	—	—
417	30, India Road	III.	—	—	3	3	1	—	—	*704*, 1,003, *1,372*	*1,138*	—
418	12, Llandilo Street	III.	—	—	—	—	—	—	—	—	705	—
419	18, Birchmore Road	I.	—	—	2	—	2	—	—	—	—	*744*
420	1, Victory Road	III.	—	—	4	1	2	—	—	712, 1,053, 1,159.	—	*1,151*, 1,524
421	16, Alford Street	III.	—	—	2	1	1	—	—	—	—	713
422	86, New Street	III.	—	—	1	3	2	—	—	—	730	—
423	39, Nelson Street	III.	—	—	—	—	—	—	—	—	—	*732*
424	1, Wellesley Street	III.	—	—	—	2	3	—	—	—	*739*	—
425	26, Hanman's Road	III.	—	—	2	3	2	—	—	*740*	1,235, 1,332	1,178
426	2, Alma Terrace	III.	—	—	1	1	2	—	—	1,240	—	*742*

VIII.

March 29th to April 11th.—During this fortnight the height of the epidemic was reached. The notifications amounted to from 40 to 50 per diem, and the main bulk of these cases were perforce obliged to be retained in their homes, whilst not a few persons had recourse to empirical remedies that were being widely advertised as panaceas for small-pox. The hospital in Stroud Road had been extended and new wards were approaching completion, whilst steps were being taken to place the superintendence of the building in the hands of a medical man experienced in small-pox hospital management.

During this fortnight 404 fresh cases became known to the authorities, and 224 houses were newly invaded. There occurred in these houses, now and subsequently, 385 cases, of which 83 were fatal:—

134 houses yielded 1 case.
52 „ „ 2 „
23 „ „ 3 „
5 „ „ 4 „
4 „ „ 5 „
4 „ „ 6 „
2 „ „ 7 „

The proportion of houses with single cases, 134, to those with multiple cases, 90, shows a distinct improvement, and seems to suggest either a diminution in infectivity or in receptivity to the poison. For the conditions favouring the spread within households were as favourable as ever, indeed more favourable than in the early weeks of the year, when hospital isolation was being promptly practised. I again select a few instances of exceptional interest.

House 432.—Every member of this family (6) was here attacked, and all the cases were left at home. The first to fall ill was the mother (aged 38), vaccinated, all the others being attacked a fortnight later. The father was vaccinated, and he and his wife had discute attacks. All the children were unvaccinated, one, a girl of 19, who was attempted unsuccessfully to be vaccinated two months previously; her attack was not a severe one, but the 3 younger children suffered severely, 2 (aged 6 months and 6 years) dying.

House 434.—A family of 7; the parents (vaccinated) escaped. Three vaccinated children (aged 7, 9, and 12) were attacked, 2 slightly, 1, the youngest (W. H.), severely. This boy had 4 large foveate vaccination scars, and his is, I think, the most severe case I have seen in a vaccinated child of his age. I saw him some weeks later, and observed that his face was deeply pitted. The only 2 unvaccinated children in this family (aged 3 and 5) died. The father remained away from home during the weeks that small-pox was in the house, for the children were nursed at home by their mother.

House 444.—Here the only unvaccinated member of the family (a child of 7) escaped; another child, over 5, vaccinated 5 days before sickening, died, as also did a girl of 14; she had 4 vaccination cicatrices, and died of malignant small-pox. The 4 other cases in this family were mild attacks.

House 473.—Two unvaccinated children attacked, 1 died, whilst 4 others, also unvaccinated, escaped. Both the cases were sent to hospital.

House 498.—Eight in family, 7 attacked and kept at home; 3 of them died, viz., the mother (aged 38), who was unvaccinated, and 2 unvaccinated children (4 and 8 years). Another unvaccinated child (aged 6) had confluent small-pox, as did 1 of the 2 vaccinated ones who were attacked (aged 16). The other case was a mild one, as also was that of the father, who, in nursing his children, became inoculated with small-pox.

House 499.—There were 6 in this family, 2 escaped, 1 of them an unvaccinated child under 10 years. But all the rest died of small-pox including the father (vaccinated), 30 years of age, and children (unvaccinated) from 2 to 6 years old.

House 502.—Every member of this family suffered, including the mother (who was unvaccinated), father (vaccinated), and 3 unvaccinated children, of whom 1 died.

House 519.—Here 4 children (unvaccinated) under 10 years were attacked, and 2 died, out of a family of 7. They were all nursed at home.

House 560.—There were 12 inmates of this house; 2 vaccinated adults were attacked, 1 removed to hospital; 5 unvaccinated children had confluent attacks, and 3 of them died. The remaining 5 (4 children and 1 adult), all vaccinated, escaped infection.

House 565.—In this family, of which the youngest member was 15 years old, all but 2 were attacked, the first to fall ill being the father, 67 years of age, then 5 others, at ages ranging from 15 to 24. All had been vaccinated in infancy. These cases were all kept at home.

House 584.—Four attacked, ages from 13 to 32; all vaccinated; all kept at home; 2 adults escaped infection.

House 603.—A mild case in a vaccinated young woman (domestic); no other case; but of the remaining 8 members of the household, 4 children had not been vaccinated. They were all over 10 years of age.

These infected houses (224) were distributed in:—

1.	Kingsholm - -	12, with	15 cases.
2.	St. Nicholas - -	8 ,,	8 ,,
3.	South Hamlet - -	187 ,,	341 ,,
4.	St. John Baptist - -	17 ,,	21 ,,

The *age*-incidence of those attacked in these houses was:—

1 month and under - -	2 cases,	2 deaths.
1 month to 1 year - -	12 ,,	6 ,,
1 to 10 years - - -	102 ,,	33 ,,
10 to 30 years - - -	152 ,,	15 ,,
30 and over - - -	117 ,,	27 ,,
	385	83

Of these 385 cases there were removed to hospital 93, of whom 26 died. Remained at home 292, of whom 57 died.

LIST OF HOUSES KNOWN TO BE INVADED BY SMALL-POX during the Fortnight ending April 11th, 1896.

[MAP 8.]

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
415	6, Ducie Street -	III.	—	—	2	—	2	—	—	1,008	—	1,364
427	11, Morton Street -	III.	—	—	2	3	2	—	—	—	1,194, 1,294	*743*
428	Windsor Villa, Stroud Road.	III.	—	—	—	4	2	—	—	—	745	*1,472*
429	71, Melbourn Street	III.	—	—	2	1	3	—	—	*746*, 1,252	—	1,146
430	25, Alma Place -	III.	—	—	—	1	1	—	—	—	—	748
431	23, Ducie Street -	III.	—	—	3	2	2	—	—	753	—	—
432	29, Nelson Street -	III.	—	1	2	1	2	—	*1,105*	*1,103*, 1,104	1,102	755, 1,101
433	34, Wellesley Street	III.	—	—	—	—	4	—	—	—	—	756, 961
434	5, Alma Place - -	III.	—	—	4	1	2	—	—	1,143, 1,144 *1,287*, *1,288*	757	—
435	45, Castle Street -	III.	—	1	3	2	2	—	—	—	—	761
436	"Anniville," Knowles Road.	III.	—	—	—	3	—	—	—	—	762, 763	—
437	56, Victoria Street -	III.	—	—	—	1	2	—	—	—	1,148	764
438	1, Mill Street - -	III.	—	—	—	2	—	—	—	—	766	—
439	22, Victoria Street -	III.	—	—	1	2	—	—	—	*1,408*	767	—
440	24, Tredworth Road	III.	—	—	—	2	3	—	—	—	—	769
441	2, India Road - -	III.	—	—	2	—	2	—	—	—	—	770, 1,376
442	12, St. James' Street	III.	—	—	—	1	1	—	—	—	772	—
443	53, Rycroft Street -	III.	—	—	2	1	1	—	—	1,260, *1,261*	773	—
444	11, Wellesley Street	III.	—	—	2	4	2	—	—	*774*	917, *1,226*, 1,227.	536, 840
445	15, Hopewell Street -	III.	—	—	1	1	2	—	—	—	775	—
446	23, Nelson Street -	III.	—	—	2	—	2	—	—	778	—	—
447	18, Alfred Street -	III.	—	—	5	2	2	—	—	—	779, 1,919	1,846
448	44, Sherborne Street	IV.	—	—	—	2	2	—	—	—	781	—
449	28, Cecil Road -	III.	—	1	2	2	—	—	—	783	—	—
450	36, Wellesley Street	III.	—	—	2	2	2	—	—	—	1,358	784
451	68, London Road -	I.	—	—	2	1	1	—	—	785, 1,325	1,098	—
452	19, Ducie Street -	III.	—	1	2	4	2	—	792	787, 790	831	789
453	7, George's Row, Merton Street.	III.	—	—	2	2	—	—	—	—	788	—
454	1, Linden Terrace -	III.	—	—	2	2	2	—	—	795, 798	—	—
455	6, Mill Street -	III.	—	—	2	—	2	—	—	—	—	*800*
456	"Lyndhurst," Linden Road.	III.	—	—	2	3	2	—	—	—	801	—
457	105A, Barton Street -	III.	—	—	1	1	2	—	—	805	—	—
458	5, Clarence Street -	IV.	—	—	—	5	2	—	—	—	—	*806*
459	65, Brook Street -	III.	—	—	—	1	2	—	—	—	807	—
460	4, West End Parade	II.	—	—	—	—	—	—	—	—	808	—
461	Lyppiat Villa, Derby Road.	I.	—	—	2	1	2	—	—	—	—	809
462	108, Melbourn Street	III.	—	—	—	4	1	—	—	—	810, 1,004	—
463	24, St. James' Street	III.	—	—	—	—	—	—	—	—	—	*811*
464	Blomfield Terrace, Linden Road.	III.	—	—	4	2	2	—	—	812, *843*, 1,175, 1,176	1,289, 1,290	—
465	3, Belgrave Terrace, Regent Street.	III.	—	—	—	—	—	—	—	—	813	—
466	26, Victory Road -	III.	—	—	1	3	2	—	—	1,582	814, 1,581	1,271
467	14, Brook Street -	III.	—	—	—	—	—	—	—	—	816	—
468	28, New Street -	III.	—	—	2	3	2	—	—	821	1,436	—
469	8, Ducie Street -	III.	—	—	1	1	1	—	—	—	825	—
470	7, Old Tram Road -	III.	—	—	—	1	2	—	—	—	834	—
472	60, India Road -	III.	—	—	3	1	1	—	—	838, 839	—	—
473	10, Nelson Street -	III.	—	—	5	1	1	—	—	841	*905*	—
474	56, Hopewell Street -	III.	—	1	—	1	2	—	—	—	—	*844*
475	2, Daventry Terrace	III.	—	—	1	2	1	—	—	—	*845*	—
476	62, New Street -	III.	—	1	2	2	1	—	*846*	—	—	1,032
477	8, St. James' Street -	III.	—	1	—	—	3	—	—	—	—	847
478	Seymour Villa, Linden Road.	III.	—	—	2	1	1	—	—	—	849	—
479	Raglan Terrace, Southgate.	III.	—	—	—	6	3	—	—	—	—	853, 1,273
480	7, Windsor Place, Milbrook Street.	III.	—	1	—	2	—	—	854	—	1,312	—
481	54, Barton Street -	III.	—	—	—	—	—	—	—	—	855, 1,456	—
482	40, Alma Place -	III.	—	—	—	2	—	—	—	—	858, 859	—
483	33, Nelson Street -	III.	—	—	2	5	2	—	—	864	—	—
484	11, Stroud Road -	III.	—	—	2	5	1	—	—	865	—	—
485	6, Robin Hood Street	III.	—	1	4	2	2	—	—	870, 1,116	1,115	—
486	2, Clement Cottages	III.	—	—	1	2	1	—	—	—	866	—
487	108, Alfred Street -	I.	—	—	—	3	—	—	—	—	869	—
488	15, Moor Street -	III.	—	—	—	—	—	—	—	—	—	877
489	66, India Road -	III.	—	—	—	2	—	—	—	—	872, 1,405	—
490	20, Albert Street -	III.	—	1	2	1	2	—	—	875	—	—
491	9, Tredworth Road -	III.	—	—	—	1	2	—	—	—	—	876
492	10, Rycroft Street -	III.	—	—	1	3	2	—	—	878	—	—

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
493	15, Wellington Street	III.	—	—	1	—	2	—	—	879	—	—
494	70, New Street -	III.	—	—	1	1	1	—	—	*1,484*	885	*1,753*
495	74. Barton Street -	III.	—	—	1	3	2	—	—	886	—	—
496	48, Wellesley Street	III.	—	—	—	1	2	—	—	—	887	1,322
497	9, Magdala Road -	III.	—	—	—	—	3	—	—	—	—	888
498	60, Regent Street -	III.	—	—	3	3	2	—	—	1,518, *1,751* *1,752.*	889, 388	1,421, *1678*
499	29, Wellesley Street	III.	—	—	4	1	1	—	—	*899, 959, 960.*	—	*1,023*
500	12, St. Paul's Road -	III.	—	—	—	3	—	—	—	—	904	—
501	124, Melbourn Street	III.	—	1	2	1	2	—	890	—	—	—
502	6, Alma Terrace -	III.	—	—	3	1	1	—	—	982, *1,108*, 1,401.	1,109	909
503	Worcester Street -	IV.	—	—	4	—	3	—	—	—	—	*910*
504	1, King's Barton Street.	III.	—	—	3	2	2	—	—	—	908	—
505	"Black Dog," Northgate.	IV.	—	—	2	6	2	—	—	912	—	—
506	6, Alma Place -	III.	—	—	5	1	1	—	—	—	907	1,439
507	20, Archibald Street	III.	—	1	1	—	2	—	—	918	—	—
508	28, India Road -	III.	—	—	1	3	—	—	—	—	*919*	—
509	55, Linden Road -	III.	—	—	1	2	2	—	—	—	921	—
510	Hope Villa, Clegram Road.	III.	—	—	3	1	2	—	—	*1,566*, 1,730	922	—
511	6, Clegram Road -	III.	—	—	1	5	2	—	—	923	—	—
512	Eunice Villa, Seymour Road.	III.	—	—	—	3	2	—	—	—	—	924
513	Midland Crossing Cottage.	III.	—	—	2	2	2	—	—	*925*, 1,386	—	—
514	46, Derby Road -	III.	—	—	—	1	2	—	—	—	926	—
515	18, Napier Street -	III.	—	—	—	3	2	—	—	—	927	—
516	8, Victoria Street -	III.	—	—	5	—	2	—	—	928	—	—
517	23, Barton Terrace -	III.	—	—	4	1	1	—	—	—	929	—
518	115, Barton Street -	III.	—	—	3	2	2	—	—	930, *1,291*	—	—
519	4, Hopewell Street -	III.	—	1	3	1	2	—	*931*	1,393, *1,394* 1,432.	—	—
520	105, Howard Street -	III.	—	—	—	3	1	—	—	—	*933*	—
521	Barton Lawn - -	III.	—	—	—	1	4	—	—	—	—	934
522	66, Barton Street -	III.	—	—	—	—	—	—	—	—	935	—
523	28, Park Road -	III.	—	—	—	1	2	—	—	—	—	936
524	83, New Street -	III.	—	—	—	—	—	—	—	—	*937*	—
525	16, Bull Lane -	IV.	—	—	3	1	2	—	—	938	—	—
526	56, New Street -	III.	—	—	—	2	2	—	—	—	944	939
527	55, Robin Hood Street	III.	—	—	3	1	1	—	—	*1,223*, 1,587	940	—
528	44, Nelson Street -	III.	—	—	1	2	1	—	—	—	941	—
529	6, Twyver Street -	I.	—	—	—	1	1	—	—	—	942	—
530	— Hanman's Road -	III.	—	—	—	—	—	—	—	*943*	—	*1,357*
531	20, Tredworth Road	III.	—	—	—	—	—	—	—	—	945	—
532	1, High Orchard Street.	III.	—	—	—	—	—	—	—	—	*946*	—
533	5, St. Mark's Street -	IV.	—	—	—	2	2	—	—	—	947, *1,471*	—
534	16, Guinea Street -	II.	—	—	4	2	1	—	—	—	948	—
535	Goulder's Yard, Norfolk Street.	III.	—	1	4	—	2	—	—	949	—	1,426
536	Pridy's Passage, Longsmith Street.	IV.	—	—	—	2	1	—	—	—	950, 1,007	1,305
537	55, New Street -	III.	—	—	3	1	1	—	—	957, *1,328*	956	—
538	30, St. Paul's Road -	III.	—	1	1	3	1	—	—	—	967, 968, 1,301.	—
539	19, Tredworth Road	III.	—	—	1	2	1	—	—	—	962	—
540	64, New Street -	III.	—	—	3	1	3	—	—	—	969	—
541	56, St. Catherine Street.	II.	—	—	—	2	1	—	—	—	970	—
542	2, Henry Street -	IV.	—	—	—	1	3	—	—	—	972	—
543	16, Sebert Street -	II.	—	—	—	1	2	—	—	—	974	—
544	23A, Arthur Street -	III.	—	—	—	—	—	—	—	*975*	—	—
545	28, Weston Road -	III.	—	—	—	4	2	—	—	—	—	976
546	48, Derby Road -	I.	—	—	—	—	2	—	—	—	—	977
547	34, Morpeth Street -	III.	—	—	2	1	2	—	—	—	—	978, 1,310
548	18, Hopewell Street -	III.	—	1	—	2	1	—	1,468	—	1,292, 1,428	—
549	18, Cambridge Street	III.	—	—	—	1	2	—	—	—	—	980
550	39, Rycroft Street -	III.	—	—	—	3	3	—	—	—	—	981
551	14, Hanman's Road -	III.	—	—	—	4	2	—	—	—	983	—
552	29, Millbrook Street	III.	—	1	1	1	1	—	*1,476*	984	—	—
553	12, Dainty Street -	III.	—	1	4	2	2	—	—	985	—	—
554	37, Salisbury Road -	III.	—	—	1	2	—	—	—	1,433	986, *1,534*	—
555	8, Alfred Street -	III.	—	1	—	2	—	—	—	—	988, 1,442	—
556	9, Albany Street -	III.	—	1	2	—	2	—	—	—	—	989
557	24, Morton Street -	III.	—	1	3	1	1	—	1,330	990	—	1,371
558	7, St. James' Street -	III.	—	—	—	—	—	—	—	*994*	—	—
559	20, Wellington Street	III.	—	—	3	—	3	—	—	—	—	995
560	10, Baker Street -	III.	—	1	5	3	3	—	*1,514*	*1,015, 1,076* 1,171, 1,513	—	998, 1,078
561	1A, Stratton Road -	III.	—	—	4	—	2	—	—	*999, 1,000*	—	—
562	Alexandra Road -	II.	—	—	—	2	3	—	—	—	—	1,001

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
563	26, Twyver Street	I.	—	—	—	4	—	—	—	—	1,005	—
564	10, Portland Street	IV.	—	—	—	2	2	—	—	—	1,006	—
565	8, Alma Terrace	III.	—	—	—	6	2	—	—	—	1,012, 1,017 1,106, 1,107 1,762.	1,011
566	31, Theresa Street	III.	—	—	3	2	2	—	—	*1,016*, 1,409	1,491	—
567	82, Alma Place	III.	1	—	4	2	—	*1,019*	—	—	*1,018*	—
568	41, New Street	III.	—	—	1	1	2	—	—	1,020	—	—
569	19, Nelson Street	III.	—	—	4	1	2	—	—	*1,021*	—	*1,713*
570	2, Forest Terrace	III.	—	—	2	1	3	—	—	—	1,448	1,022 *1,477*
571	28, Clegram Road	III.	—	—	—	2	2	—	—	—	—	*1,024*
572	108, Alma Place	III.	1	—	1	5	2	*1,454*	—	—	—	1,025, 1,453
573	5, Old Tram Road	III.	—	—	—	—	2	—	—	—	—	1,026, *1,463*
574	64, Salisbury Road	III.	—	—	—	3	2	—	—	—	1,027	1,541
575	10, Alfred Street	I.	—	—	1	—	2	—	—	—	—	*1,028*
576	26, Barton Street	III.	—	—	—	1	2	—	—	—	—	1,029
577	Old Row, Milbrook Street.	III.	—	—	3	3	2	—	—	1,030	1,651	1,477
578	Elm Villa, Stroud Road.	III.	—	—	—	1	2	—	—	—	1,031	—
579	97, Barton Street	III.	—	—	—	2	2	—	—	—	1,033	—
580	76, New Street	III.	—	1	—	4	2	—	—	—	1,086	1,034
581	37, Robin Hood Street	III.	—	—	—	3	1	—	—	—	—	1,035
582	7, Blenheim Road	III.	—	—	—	5	2	—	—	—	1,036	—
583	34, Castle Street	III.	—	—	—	—	—	—	—	—	—	*1,037*
584	30, Victoria Street	III.	—	—	—	3	3	—	—	—	1,039, 1,469 1,710.	1,038
585	37, Stroud Road	III.	—	—	1	4	3	—	—	1,702	—	*1,040*, 1435
586	33, Rycroft Street	III.	—	—	2	2	2	—	—	1,399	—	*1,041*
587	60, Sweetbriar Street	IV.	1	—	1	3	—	—	—	—	1,042, 1,733	—
588	20, Robin Hood Street	III.	—	1	1	1	3	—	—	—	1,043	—
589	62, Regent Street	III.	—	—	1	—	2	—	—	—	—	1,044
590	2, Henry Place, Slaney Street.	III.	—	—	—	5	2	—	—	—	1,045	—
591	32, Cecil Road	III.	—	—	1	1	1	—	—	*1,198*	1,046	—
592	28, Wellesley Street	III.	—	—	4	3	1	—	—	—	1,047	—
593	"The Manse," Weston Road.	III.	—	—	1	4	3	—	—	—	—	*1,048*
594	Turk's Yard, Swan Lane.	IV.	—	—	—	1	1	—	—	—	1,049	—
595	8, Windmill Parade	I.	—	1	3	—	2	—	—	*1,051*	—	—
596	3, Lady-bellgate	IV.	—	—	—	2	—	—	—	—	*1,052*	—
597	29, Howard Street	III.	—	—	—	1	2	—	—	—	1,054	—
598	10, Castle Street	III.	—	—	2	4	2	—	—	—	—	1,055
599	51, Napier Street	III.	—	—	1	2	2	—	—	1,056	—	1,957
600	21, Worcester Parade	IV.	—	—	1	1	2	—	—	—	—	1,057
601	26, Wellesley Street	III.	—	—	—	2	2	—	—	—	—	*1,058*
602	90, Sherborne Street	IV.	1	—	4	3	3	—	—	*1,059*	—	—
603	3, Howard Street	III.	—	—	—	5	4	—	—	—	1,060	—
604	St. James' Crescent, Barton Street.	III.	—	1	—	2	—	—	—	—	1,061	—
605	112, Alma Place	III.	—	—	1	1	1	—	—	1,062	—	1,064
606	22, Wirrall Street	II.	—	—	1	5	2	—	—	1,063	—	—
607	126, Milbrook Street	I.	—	—	1	—	3	—	—	—	—	1,066
608	Cut Hill House, Stroud Road.	III.	—	—	1	2	2	—	—	1,097	*1,254*	1,067
609	23, Theresa Street	III.	—	—	—	—	—	—	—	—	1,068, 1,464	—
610	Grove Villa, Alfred Street.	I.	—	1	4	1	3	—	—	—	—	1,070
611	13, Conduit Street	III.	—	—	—	3	2	—	—	—	1,071	1,072
612	78, Alma Place	III.	—	—	1	2	1	—	—	1,522	1,073, 1,523	—
613	69, Bristol Road	III.	—	—	—	—	—	—	—	—	—	*1,074*
614	10, Victoria Street	III.	—	—	—	1	1	—	—	—	1,377	1,077
615	19, Regent Street	III.	—	—	—	3	2	—	—	—	—	1,081
616	34, St. James' Street	III.	—	—	1	4	2	—	—	—	1,096	1,649
617	Brisbane Cottage, Parliament Street.	IV.	—	—	1	—	2	—	—	—	—	1,082
618	Cavendish House, Clegram Road.	III.	—	1	2	2	1	—	—	—	1,083	—
619	15, Princes Street	III.	—	—	1	1	3	—	—	—	—	*1,084*
620	83, St. Catherine Street.	II.	—	—	—	5	2	—	—	—	*1,085*	—
621	106, New Street	III.	—	1	—	3	—	—	—	—	1,087	—
622	41, Princes Street	III.	—	—	—	—	3	—	—	—	—	*1,088*
623	22, Jersey Road	III.	—	—	1	4	2	—	—	—	1,090	—
624	4, Dynevor Street	III.	—	—	1	3	1	—	—	—	1,091	—
625	14, Knowles Road	III.	—	—	3	3	—	—	—	—	1,092	—
626	27, Dynevor Street	III.	—	—	—	—	2	—	—	—	—	1,093, 1,488
627	27, Union Street	IV.	—	—	1	5	2	—	—	—	1,095	—
628	56, Linden Road	III.	—	—	—	—	—	—	—	—	1,099	—
629	70, Suffolk Street	IV.	—	—	—	3	2	—	—	—	1,100	—
630	20, Carmarthen Street.	III.	—	—	3	—	2	—	—	—	—	1,112, 1,530
631	4, High Orchard Street.	III.	—	—	1	3	2	—	—	—	—	1,113

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
632	45, Robin Hood Street	III.	—	1	3	2	1	—	1,446	1,114, 1,222 1,501.	1,500	—
633	28, Alma Place	III.	—	1	2	6	2	—	*1,224*	—	*509*, 1,118	1,610
634	104, Alma Place	III.	—	—	1	6	2	—	—	1,589	1,119, 1,889	—
635	61, Alma Place	III.	—	1	3	2	2	—	—	—	—	1,120
636	8, Nelson Street	III.	—	—	3	2	2	—	—	1,122	—	—
637	99, Falkner Street	III.	—	—	3	4	2	—	—	—	—	1,124
638	39, Victoria Street	III.	—	—	2	1	2	—	—	—	—	1,125
639	41, East End Road	I.	—	—	1	2	—	—	—	—	*1,129*	—
640	10, Hopewell Street	III.	—	—	—	—	2	—	—	—	—	1,131, 1,132
641	44, Clifton Terrace	III.	—	—	—	2	3	—	—	—	1,133	1,134
642	43, Alma Place	III.	—	—	—	2	—	—	—	—	1,135	—
643	Clare Street, St. Mary's Square.	II.	—	—	2	2	—	—	—	—	1,136	—
644	161, High Street	III.	—	—	—	3	1	—	—	—	—	*1,137*
645	32, Widden Street	III.	—	—	—	—	3	—	—	—	—	1,139, 1,577
646	35, Victory Road	III.	—	—	1	2	1	—	—	—	1,140	1,192
647	12, Dynever Street	III.	—	—	—	1	2	—	—	—	—	1,141
648	The Spa	III.	—	—	—	2	2	—	—	—	—	1,147
898	19, Herbert Road	I.	—	—	—	—	—	—	—	—	680	*1,593*
912	26, Clegram Road	III.	—	—	1	4	2	—	—	—	—	*771*

IX.

April 12th to April 25th.—The subsidence of the outbreak of small-pox did not at first proceed very rapidly. There were certainly fewer attacks, viz., 334 in this fortnight, as compared with 404 in the preceding, but there were 202 new invasions of houses, only 22 less than in that period.

It was at this time that there was introduced a new factor which, although claimed to check the disease, tended rather to defeat its own object, for, in not a few instances with which I am acquainted, it did directly disseminate it. I allude to the introduction into the city, through private enterprise, of the hydropathic system of treatment, mention of which cannot be avoided in the history of this epidemic. Quite apart from any question as to the intrinsic value of such treatment, which within due limits is well recognised, it must be admitted that the doctrines upon which its employment in acute specific diseases is sometimes based are lacking in any scientific support. I do not think I shall be misrepresenting these views by stating that, applied to small-pox, they are tantamount to a non-recognition of the risks of contagion. It is held that the system of tepid baths (with permanganate in them) adopted at the earliest appearance of symptoms of febrile illness can not only subdue the fever, but check the natural development of the disease, and also rob it of its infectivity. It was proclaimed almost in as many words, that the small-pox would speedily be banished from Gloucester by the adoption of this method of treatment, and I was myself assured by its director that all cases could be "cured" by it. It is not surprising that, under the circumstances of an epidemic disorder which had already been so striking in its ravages, the suggestions thus boldly advanced should have been received with acclamation by persons ignorant of the natural course of the malady, but it is somewhat astonishing that intelligent and thinking people could have been deceived thereby. At any rate, the system was soon established in the city, and a fund was raised to defray the cost of carrying it out. There were many enthusiastic supporters in the cause, which in so far as it inculcated cleanliness and ventilation of infected houses deserved recognition, and it may possibly have had some effect in diminishing the spread of contagion within the house itself. Application was made to the Sanitary Authority to grant the use of a place of worship in the Derby Road (of which the minister was the most prominent supporter of this system) as a hospital for the treatment, but naturally the establishment of an infected centre in that neighbourhood could not be sanctioned. The treatment was therefore carried on, under the supervision of its director, at the houses of the patients, a staff of young men and women, mostly connected with the religious community referred to, being employed in the capacity of nurses. Their devotion was, in many instances, rewarded by themselves being attacked with small-pox, and sometimes they conveyed the contagion to their own homes.

It is perhaps needless to add that, naturally, as time went on, cases of severe as well as mild type came under this treatment, and several deaths occurred, some "uncertified," and buried by the coroner's order, others certified by a medical man called in towards the end of the case. But the dissemination of the disease, owing to this widespread adoption of house-to-house hydropathy, was not limited to those employed in carrying the system out. Many of the patients, who feeling well were allowed and indeed encouraged to go out, since they were told that they were free from infection, were about the streets in an infectious state. Again, several cases subjected to this treatment were either not notified to the authorities at all, or, if so, at a date much after that at which, had they been declared, precautions could have been insisted upon. I have no hesitation in saying that over and above the risk of diffusion due to so large a proportion of cases being retained in their homes (and the adoption of this treatment of necessity antagonised efforts to remove patients to hospital), this system, as carried out, was to some extent responsible for keeping up the epidemic throughout the following weeks.

In the 202 houses newly invaded during this fortnight, 297 cases occurred, of which 55 were fatal, a distinct diminution in fatality, which may be due to fewer children being attacked, and to the greater proportion of mild cases.

141	houses	yielded each	1	case.
39	"	"	2	"
17	"	"	3	"
2	"	"	4	"
2	"	"	5	"
1	"	"	9	"

House 678.—Of 12 inmates of this house, nine were attacked with small-pox, four of whom died. Two of the cases were removed to hospital, viz., the first and the last to be attacked (on April 15th and June 13th respectively). Of those attacked five were children (1 to 6 years) unvaccinated, of whom three died; three were between 13 and 15 years, had mild attacks, and had been vaccinated in infancy; and the father, aged 40, who had never been vaccinated, died. Those who escaped were two of those vaccinated in infancy, and one a child of 8, vaccinated when the others were attacked.

House 690.—The history of this family is of especial interest, since one of the three (out of five) attacked was a child of 5 years of age, who had been vaccinated successfully 3 weeks before. The first to fall ill was the mother (aged 26), who had been vaccinated in infancy, and had two fair marks. She had a coherent attack, and did not got to hospital. Her illness commenced on April 12th. On the 15th, one of her three children was vaccinated (the eldest of them had already been vaccinated). This child sickened with small-pox on May 7th, and died on the 16th. An infant, 16 months old, unvaccinated, was attacked on May 26th, and had a severe attack.

In perusing the notes taken of those households of which information was obtained, one is struck by the fact that not only was there an apparent shifting of the incidence of the disease from children to adults, but that the relative proportions of those attacked amongst the vaccinated and unvaccinated were also altering, whilst at the same time a far higher proportion occur of those who were vaccinated on the first appearance of the disease in the house, and who escaped infection. This increase in the recently vaccinated class is due to the fact that the officers of the vaccination committee by the board of guardians were now actively pursuing their house-to-house visitations.

Coincidently there is a further decline in the proportion of houses having multiple cases, for of the 202 invaded, 141 had single cases, and 61 multiple.

These houses were thus distributed:—

1. Kingsholm	4,	with	7 cases.
2. St. Nicholas	14	"	20 "
3. South Hamlet	169	"	250 "
4. St. John Baptist	15	"	20 "

The *age*-incidence of the 297 attacks was:—

1 month and under	8 cases,	8 deaths.
1 month to 1 year	7 "	4 "
1 to 10 years	62 "	20 "
10 to 30 "	116 "	8 "
30 and over	104 "	15 "
	297	55

Of these cases there were removed to hospital 98, of whom 25 died.
Remained at home 199, of whom 30 died.

List of Houses known to be invaded by Small-pox during the Fortnight ending April 25th, 1896.

[Map 9.]

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
404	26, Melbourn Street -	III.	—	1	2	1	1	—	—	—	1,320	—
649	27, Nelson Street -	III.	—	—	4	3	2	—	—	—	1,400, 1,639	1,775
650	68, New Conduit Street.	III.	—	—	2	1	2	—	—	—	—	1,149
651	34, Clifton Road -	III.	—	—	1	3	2	—	—	—	1,150	—
652	1, Avenue Road -	III.	—	—	1	4	2	—	—	—	1,152, 1,660	1,263
653	8, Cecil Road -	III.	—	—	—	—	—	—	—	—	1,153	—
654	39, Victory Road -	III.	1	—	—	1	1	*1,412*	—	—	*1,154*	—
655	14, Conduit Street -	III.	—	—	2	1	1	—	—	—	—	1,155
656	26, Wellington Street	III.	—	—	1	2	2	—	—	—	*1,156*	—
657	50, St. Paul's Road -	III.	—	—	—	1	2	—	—	—	1,157	—
658	"Mayville," Knowles Road.	III.	—	—	3	1	2	—	—	—	—	1,158
659	68, Victoria Street -	III.	—	—	—	—	—	—	—	—	—	1,160
660	40, New Street -	III.	—	—	1	—	2	—	—	1,162	—	—
661	17, Theresa Street -	III.	—	—	1	3	2	—	—	—	*1,163*	—
662	Albert Villa, Linden Road.	III.	—	—	1	1	1	—	—	—	1,164	—
663	10, Magdala Terrace	III.	—	—	—	1	2	—	—	—	—	1,165
664	21, Conduit Street -	III.	—	—	—	—	3	—	—	—	—	1,166
665	56, Melbourn Street -	III.	—	—	—	—	2	—	—	—	—	1,167, 1,618
666	40, Sherborne Street	IV.	—	—	—	2	—	—	—	—	1,168, 1,543	—
667	Levi's Court, Westgate.	II.	—	—	1	4	2	—	—	—	1,306	*1,170*
668	43, Robin Hood Street	III.	—	—	—	3	2	—	—	—	1,172	—
669	21, Hyde Lane -	I.	—	—	—	—	—	—	—	—	519	—
670	27, Castle Street -	III.	—	—	1	3	1	—	—	—	1,177	—
671	3, Exhibition Street -	III.	—	—	1	3	1	—	—	*1,179*	1,533	—
672	5, Alma Terrace -	III.	—	1	3	—	2	—	*1,684*	1,180	—	1,580
673	13, Castle Street -	III.	—	—	—	4	2	—	—	—	1,181	1,499
674	34, Tredworth Road	III.	—	—	2	—	2	—	—	1,182, 1,560	—	—
675	9, Victory Road -	III.	—	—	2	4	2	—	—	—	1,183	—
676	143, Barton Street -	III.	—	—	—	1	1	—	—	—	1,186	—
677	46, Robin Hood Street	III.	—	—	1	—	1	—	—	1,187	—	—
678	33, Alma Place -	III.	—	—	6	4	2	—	—	*1,188*, *1,492* 1,511, 1,698 *1,699*.	1,512, 1,701 1,913.	*1,700*
679	32, Victory Road -	III.	—	—	2	1	1	—	—	1,191	—	—
680	96, Victoria Street -	III.	—	—	4	—	2	—	—	1,196	—	—
681	36, Seymour Road -	III.	—	—	1	1	2	—	—	—	—	1,197
682	10, Morton Street -	III.	—	—	4	3	2	—	—	—	1,199	—
683	47, Alma Place -	III.	—	—	2	1	1	—	—	—	—	1,200
684	3, Alma Place, St. James' Street.	III.	—	—	—	1	3	—	—	—	1,201	1,478
685	3, Massey Parade -	III.	—	—	—	—	—	—	—	—	1,202	—
686	20, Alvin Street -	IV.	—	—	—	1	1	—	—	—	1,203	1,590
687	42, New Street -	III.	—	—	4	1	4	—	—	—	1,538	*1,204*
688	2, Sherborne Street -	IV.	—	—	3	1	3	—	—	—	—	*1,205*
689	74, Castle Street -	III.	—	—	—	—	—	—	—	—	—	1,206
690	5, Linden Road -	III.	—	—	3	2	—	—	—	*1,695*, 1,821	1,207	—
691	13, Carmarthen Street	III.	—	1	3	1	1	—	—	—	1,208	—
692	164, Melbourn Street	III.	—	—	3	4	2	—	—	1,210	1,209	*1,420*
693	26, Carmarthen Street	III.	—	—	—	2	—	—	—	—	1,211	—
694	30, St. James' Street	III.	—	—	1	1	1	—	—	—	—	1,212
695	1, Witticomb Terrace, Kings Barton Street.	III.	—	—	—	2	2	—	—	—	1,213	—
696	59, Stroud Road -	III.	—	—	1	—	2	—	—	—	—	1,215
697	5, Wyndale Terrace, St. Paul's Road.	III.	—	—	2	—	2	—	—	—	—	1,216
698	25, Victory Road -	III.	—	—	—	1	1	—	—	—	1,217	—
699	6, Berkeley Villas, Bristol Road.	III.	—	—	—	—	—	—	—	—	1,218	—
700	11, St. James' Street	III.	—	—	—	2	3	—	—	—	*1,219*	—
701	196, Barton Street -	III.	—	—	—	1	2	—	—	—	—	1,220
702	11, Union Street -	IV.	—	—	—	—	2	—	—	—	—	*1,221*, 1,531
703	60, Castle Street -	III.	—	1	—	—	2	—	—	—	—	1,225
704	10, Victory Road -	III.	—	—	3	1	2	—	—	—	—	1,228, 1,612
705	110, New Street -	III.	—	—	2	1	2	—	—	—	1,230	—
706	98, Barton Street -	III.	—	—	—	—	—	—	*1,556*	—	—	*1,231*
707	149, High Street -	III.	—	1	1	—	2	—	—	—	—	1,234
708	3, Bishopstone Road	I.	—	—	3	3	2	—	—	—	—	1,236
709	1, St. James' Street -	III.	—	—	1	4	2	—	—	1,237	—	—
710	24, Morpeth Street -	III.	—	—	—	3	2	—	—	—	1,238	—
711	21, Hopewell Street -	III.	—	—	2	1	1	—	—	—	1,239	—
712	27, Sidney Street -	I.	—	1	3	4	3	—	—	—	1,241, 1,379	—
713	101, Bristol Road -	III.	—	—	—	—	3	—	—	—	—	*1,242*
714	25, Alvin Street -	IV.	—	—	—	—	3	—	—	—	—	1,243
715	30, Morton Street -	III.	—	—	2	—	2	—	—	1,244, *1,250*	—	—

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
716	25, Castle Street -	III.	—	—	1	2	—	—	—	—	1,245	—
717	47, New Street -	III.	—	—	1	2	2	—	—	—	—	1,248
718	4, Cecil Road - -	III.	—	—	—	—	—	—	—	*1,255*	—	—
719	31, Ducie Street -	III.	1	—	2	3	—	*1,298*	—	—	1,256, 1,297	—
720	23, Stroud Road -	III.	—	-	1	3	2	—	—	—	1,257, 1,425	—
721	4, Forest Terrace -	III.	1	—	—	3	—	*1,489*	—	—	1,258, 1,430	—
722	32, Moor Street -	III.	—	—	3	5	—	—	—	1,553, 1,705	1,259, 1,552	—
723	19, Hopewell Street -	III.	—	—	3	3	2	—	—	1,262	1,446	—
724	18, Melbourn Street	III.	—	—	—	1	1	—	—	—	—	1,264
725	4, Albany Street -	III.	—		3	2	2	—	—	1,611	—	1,265
726	53, Bristol Road -	III.	—	—	—	3	—	—	—	—	1,267	—
727	6, Ducie Cottages, Ducie Street.	III.	—	—	—	—	—	—	—	—	*1,268*	—
728	31, Victory Road -	III.	—	—	2	3	4	—	—	—	1,272	1,437, *1,681*
729	30, Hanman's Road -	III.	—	—	1	1	2	—	—	—	—	1,274
730	46, Lower Westgate Street.	II.	—	—	—	—	—	—	—	—	—	*1,275*
731	22, Melbourn Street -	III.	—	—	3	1	1	—	—	*1,276*	—	—
732	46, Morton Street -	III.	—	—	—	—	4	—	—	—	—	1,277, 1,878
733	23, Union Street -	IV.	—	—	4	2	—	—	—	—	1,278	—
734	28, St. James' Street	III.	—	—	—	2	1	—	—	—	1,279, 1,616	—
735	Stephen's Court, Westgate.	II.	—	—	—	—	—	—	—	1,280, 1,309	—	1,283
736	35, Castle Street	III.	—	—	—	2	—	—	—	—	1,281	—
737	24, Clifton Road -	III.	—	1	2	1	1	—	—	—	1,282	—
738	102, Priory Road -	II.	—	—	—	4	2	—	—	—	1,284	—
739	13, Philip Street -	III.	—	—	3	4	2	—	—	*1,286*, 979 1,507	1,434, 1,506	—
740	18, Paul Street -	III.	—	—	—	—	—	—	—	—	1,293	—
741	43, New Street -	III.	—	—	5	3	2	—	—	—	—	1,295, 1,588
742	2, Llandilo Street -	III.	—	1	1	3	—	—	—	—	1,296	—
743	9, Morton Street -	III.	—	—	4	3	2	—	—	—	1,299	—
744	21, Melbourn Street -	III.	—	1	—	2	2	—	*1,300*	—	—	1,601
745	Stephen's Court, Westgate.	II.	1	—	2	1	2	*1,579*	—	—	—	1,302
746	Stephen's Court, Westgate.	II.	—	—	—	—	—	—	—	—	—	1,303
747	61, New Street -	III.	—	—	2	3	—	—	—	*1,304*	—	—
748	17, Stroud Road -	III.	—	—	1	2	2	—	—	—	1,307	—
749	45, Morton Street -	III.	—	—	—	—	3	—	—	—	—	*1,308*
750	118, Barton Street -	III.	—	—	1	2	2	—	—	—	1,311	—
751	40, Nelson Street -	III.	—	—	3	6	1	—	—	—	1,313	—
752	30, Victory Road -	III.	—	—	1	1	2	—	—	1,314	—	1,551, 1,650
753	46, Suffolk Street -	IV.	—	—	1	6	3	—	—	—	1,316	1,475
754	17, Wellesley Street -	III.	—	—	1	3	2	—	—	—	1,317	—
755	2, Quay Street -	II.	—	—	1	5	3	—	—	—	1,318	—
756	1, Jersey Road -	IV.	—	—	—	3	2	—	—	—	1,319	—
757	16, Blackfriars -	IV.	—	2	1	2	—	—	—	—	1,321	—
758	42, Clement Street -	III.	—	—	—	4	2	—	—	—	1,323	—
759	52, St. James' Street	III.	—	—	1	—	2	—	—	1,324	—	—
760	6, Back Cottage, St. James' Street.	III.	—	—	2	—	2	—	—	1,327, *1,365*	—	—
761	29, Clegram Road -	III.	—	—	3	4	2	—	—	1,333, 1,334, 1,494.	1,335	—
762	13, Worcester Parade	IV.	—	—	—	—	—	—	—	—	1,336, 1,595	—
763	47, Melbourn Street -	III.	—	—	5	1	1	—	—	*1,337*	—	—
764	11, Church Street -	III.	—	—	1	2	2	—	—	—	1,338	—
765	74, Alvin Street -	IV.	—	—	1	1	3	—	—	—	—	1,339
766	68, Milbrook Street -	III.	—	—	—	—	2	—	—	—	—	*1,340*
767	3, Birchmore Road -	I.	—	1	2	—	2	—	1,735	—	—	1,341, 1,661
768	24, Clement Street -	III.	—	—	—	4	2	—	—	—	1,343, 1,344	—
769	48, Clement Street -	III.	—	—	—	5	1	—	—	—	1,345	—
770	5, Church Street -	III.	—	—	—	—	—	—	—	—	—	1,346
771	75, Howard Street -	III.	—	—	4	—	2	—	—	1,347	—	—
772	126, Barton Street -	III.	—	—	1	—	2	—	—	1,348	—	1,626, 1,686
773	9, Windsor Place, Milbrook Street.	III.	—	—	—	1	2	—	—	—	—	1,349
774	16, Conduit Street -	III.	—	—	—	3	2	—	—	—	1,350	—
775	24, Upton Street -	III.	—	—	—	1	2	—	—	—	1,351	—
776	Stephen's Court, Westgate.	II.	—	—	—	1	2	—	—	—	1,352	1,578
777	25, Tredworth Road -	III.	—	—	—	1	1	—	—	—	1,353	—
778	4, St. Nicholas Terrace	II.	—	—	—	—	—	—	—	*1,354*	—	—
779	96, Barton Street -	III.	—	—	—	—	—	—	—	—	—	1,355
780	5, Clare Terrace, Clegram Road.	III.	—	—	2	1	1	—	—	1,356	—	—
781	6, Blackfriars -	IV.	1	—	2	1	2	*1,359*	—	—	—	—
782	15, Clement Street -	III.	—	—	1	1	2	—	—	—	—	1,390
783	34, Stratton Road -	III.	—	—	—	2	2	—	—	—	1,361	—
784	20, Sherborne Street	IV.	—	—	—	—	—	—	—	—	1,362	—
785	3, Clement Street -	III.	—	—	2	6	2	—	—	—	1,363	—
786	50, Alma Place -	III.	1	—	2	1	2	*1,632*	—	1,366	—	
787	57, Ducie Street -	III.	—	1	—	2	—	—	—	—	1,370	—
788	Stephen Court, Westgate.	II.	—	—	—	—	—	—	—	—	1,373	—

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
790	Forester's Court, Westgate.	III.	—	—	3	1	1	—	—	1,375	—	*1,621*
791	27, Stroud Road -	III.	—	—	2	5	2	—	—	—	1,378	—
792	56, Clement Street -	III.	—	1	—	2	—	—	—	—	1,380	—
793	12, Paul Street -	III.	—	—	—	—	2	—	—	—	—	1,381
794	Dora Cottage, Carmarthen Street.	III.	—	—	2	2	3	—	—	—	1,423	1,382
795	129, Barton Street -	III.	—	—	3	2	1	—	—	1,384	—	1,383
796	33, Salisbury Road -	III.	—	—	3	3	1	—	—	—	1,385	—
797	138, Barton Street -	III.	—	—	—	3	2	—	—	—	1,387	—
798	34, Clement Street -	III.	—	—	1	2	2	—	—	—	—	1,388
799	Rose Cottage, Barton Street.	III.	—	—	—	1	2	—	—	—	*1,389*	—
800	57, New Street -	III.	—	1	2	2	—	—	—	—	1,391	—
801	12, Clement Street -	III.	—	1	—	2	—	—	*1,722*	—	1,392	—
802	13, Robin Hood Street	III.	—	—	2	3	2	—	—	—	—	1,395
803	Round House, Tredworth Road.	III.	—	—	2	2	2	—	—	—	—	1,396
804	1, Alma Place, St. James' Street.	III.	—	—	1	1	1	—	—	1,397	—	*1,635*
805	10, India Road -	III.	—	1	3	3	1	—	1,636	*1,398*, 1,665	1,605	1,769
806	58, Alma Place -	III.	—	—	2	2	1	—	—	—	*1,402*	—
807	Bath Buildings, Stroud Road.	III.	—	—	—	—	—	—	—	—	1,403	—
808	62, Robin Hood Street	III.	—	—	4	—	2	—	—	1,404	—	1,685
809	26, Barton Street -	III.	—	—	1	1	1	—	—	—	1,406	—
810	61, Rycroft Street -	III.	—	—	—	—	2	—	—	—	—	1,407
811	23, Milbrook Street -	III.	—	—	4	3	2	—	—	—	—	1,410
812	42, Tredworth Road -	III.	1	—	—	3	—	*1,561*	—	—	*1,411*	—
813	35, Ducie Street -	III.	—	—	—	—	—	—	—	1,413, 1,668	—	1,637
814	6, Paul Street -	III.	—	—	4	1	2	—	—	1,414, *1,743*	—	1,903
815	9, Matson Place -	III.	—	—	—	2	2	—	—	—	1,415	—
816	3, Clement Cottage -	III.	—	—	1	1	1	—	—	—	1,417	—
817	55, Victoria Street -	III.	—	1	4	—	2	—	—	*1,418*, *1,521*	—	1,520
818	21, Matson Place -	III.	—	—	—	2	1	—	—	—	1,419	—
819	38, Longsmith Street	III.	—	—	—	3	1	—	—	—	—	1,422
820	101, Howard Street -	III.	—	—	—	1	2	—	—	—	—	1,424
821	32, Hopewell Street -	III.	—	—	2	—	2	—	—	—	—	1,427
822	38, Hopewell Street -	III.	—	—	—	1	2	—	—	—	—	1,429
823	3, Dynevor Street -	III.	—	—	4	6	1	—	—	1,431	—	1,692
824	27, Barton Terrace -	III.	—	—	—	1	3	—	—	—	—	*1,438*
825	40, Melbourn Street -	III.	—	—	2	—	2	—	—	—	—	1,440
826	28, Clement Street -	III.	—	—	—	1	2	—	—	—	—	1,441
827	191, High Street -	III.	—	—	—	2	1	—	—	—	1,443	—
828	50, Salisbury Road -	III.	—	—	2	—	3	—	—	—	—	1,444, 1,709
829	48, Moor Street -	III.	—	1	4	1	2	—	—	1,445	—	—
830	21, Carmarthen Street	III.	—	—	—	—	3	—	—	—	—	1,449
831	6, St. James' Street -	III.	—	—	—	1	—	—	—	—	1,450	—
832	3, St. James' Street -	III.	—	1	—	2	—	—	1,451	—	—	—
833	26, St. Mary's Square	II.	—	—	—	—	—	—	—	—	—	1,452
834	17, Swan Lane -	IV.	—	—	—	—	—	—	—	—	—	1,457
835	1, Railway Cottage, Union Street.	IV.	—	—	—	—	—	—	—	—	1,458	—
836	30, Melbourn Street -	III.	—	—	2	1	2	—	—	—	—	1,459
837	78, Melbourn Street -	III.	—	—	1	—	2	—	—	—	—	1,460
838	"Laburnum" Inn, Albany Street.	III.	—	—	—	—	—	—	—	—	1,461	—
839	30, Albany Street -	III.	—	—	2	2	1	—	—	—	1,462	—
840	4, Castle Street -	III.	—	—	3	2	2	—	—	*1,465*	—	—
841	6, Raglan Street -	III.	—	—	5	—	2	—	—	—	—	1,467
842	25, Carmarthen Street	III.	—	1	1	1	2	—	—	1,725	—	1,470, 1,741
843	Smith's Lodging House, Westgate.	II.	—	—	—	—	—	—	—	—	—	1,473
844	90, Lower Westgate	II.	—	—	—	1	—	—	—	—	1,474	—
845	3, Victoria Cottage, Barton Street.	III.	—	—	—	—	—	—	—	*1,479*	—	—
846	26, Clifton Road -	III.	—	—	1	—	4	—	—	—	—	1,480
847	12, Princes' Street -	III.	—	—	1	2	3	—	—	—	—	1,481
848	57, Rycroft Street -	III.	—	—	1	1	2	—	—	—	1,482	—
940	33, Ducie Street -	III.	—	—	—	—	—	—	—	*1,232*	—	1,229
944	13, Clement Street -	III.	1	—	—	2	1	*1,768*	—	—	1,360	1,662

X.

April 26th to May 9th.—An appreciable decline in the epidemic was observed during this fortnight, although cases were still being notified every day. The total number known to have arisen during this period was 197, and the newly invaded houses amounted to 101, precisely one-half of the number invaded during the previous fortnight. The cases which occurred in these houses numbered 158, of whom 27 died. They were thus distributed:—

66	houses	yielded	1	case.
24	,,	,,	2	,,
3	,,	,,	3	,,
5	,,	,,	4	,,
3	,,	,,	5	,,

That Gloucester still contained unvaccinated children was seen by the fact that several were attacked in the first week in May, some of which may be cited:—

House 850.—In this house four adults were attacked, and two died. The first case was that of a man (1,485) employed at a public-house, who is supposed to have been infected by calling at houses where cases of small-pox were. He was 60 years of age, and had never been vaccinated; he was attacked on April 22nd, removed to hospital on the 26th, where he died on May 1st. The house was duly disinfected, but at the end of two months a second case occurred in it (No. 1,959); also a man 60 years of age (vaccinated), who was attacked on June 22nd, removed to hospital on the 29th, and died on July 2nd. The daughter of the first patient was attacked on July 11th, and the wife of the second patient on July 13th, the former having a mild, the latter a coherent attack; both were unvaccinated.

House 895.—In this family of eight the unvaccinated members, all children between 1 and 8 years of age, were the only ones attacked. They had enjoyed very good health previously,—indeed, I have been struck with the number of well-nourished, healthy-looking children who have been attacked in this epidemic. There is no ground for the belief that small-pox selects those who are already debilitated. The first of these children to fall ill was 5 years of age. His attack was a comparatively mild (discrete) one, and he was left at home. His illness commenced on April 25th, and on May 1st his brother, 4 years old, sickened, to be followed on the 8th and 14th by a girl, aged 8, and boy, aged 18 months. These children were removed in turn to the hospital, where they died. Two elder children (vaccinated) and the parents escaped.

House 904.—Here again those attacked were the unvaccinated children, four in number, ages ranging from 3 to 8. They fell ill one after another on May 1st, 19th, 31st, and 31st, and were all kept at home; three of the attacks were severe, one coherent.

House 906.—The only one to be attacked was a child of 8 years, who also was the only unvaccinated inmate of the household of seven persons. She was kept at home, and died.

House 924.—The father of this family died of small-pox in his house, on May 12th. Three of his children were attacked subsequently, two of them about a week, and the other nearly three weeks later, but their cases were not known to the authorities until the end of May. On my visit I found that another member (a girl of 11 years) had had a mild attack prior to her father's illness. She was vaccinated, and so was the man, but the three other children, aged 3 to 9 years, were unvaccinated, the eldest having a mild, the others confluent attacks.

House 929.—Here the mother (No. 1,641), a young woman of 25, was the first to be attacked. She remained at home, and her four unvaccinated children, of whom two died, sickened subsequently.

House No. 932.—The head of this household was the most active promoter of the hydropathic treatment to which reference has been made. He had a mild attack, as also had his son (who was then lodging away from home), both probably contracted in their visits to infected houses. The former's wife, 38 years of age, who had never been vaccinated, had a somewhat severe attack accompanied by much mental disturbance, whilst an unvaccinated infant had a comparatively slight (coherent), and a vaccinated daughter of 18, a very mild attack. The case of Mr. S. led subsequently to judicial proceedings, when he was fined for going about in public when still in an infected state. A young woman (No. 1,806) who was in close attendance on Mrs. S. during her illness, and who stated that she had been re-vaccinated six weeks previously, was inoculated on the cheek, where a characteristic "inoculated" pustule formed.

Of these 101 invaded houses there were situated:—

1. Kingsholm	- - -	6	houses,	with	9 cases.
2. St. Nicholas	- - - - -	8	,,	,,	13 ,,
3. South Hamlet	- - -	78	,,	,,	121 ,,
4. St. John Baptist	- - - - -	9	,,	,,	15 ,,

The *age*-incidence of those attacked in the houses was :—

1 month and under	1 case,	1 death.
1 month to 1 year	1 ,,	0 ,,
1 to 10 years	46 ,,	14 ,,
10 to 30 years	58 ,,	3 ,,
30 and over	52 ,,	9 ,,
	158	27

Of these cases three were removed to hospital 36, of whom 11 died. Remained at home 122, of whom 16 died.

LIST OF HOUSES KNOWN TO BE INVADED BY SMALL-POX during the Fortnight ending May 9th, 1896.

[MAP 10.]

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
849	22, Victory Road	III.	—	—	—	—	—	—	—	—	—	1,483, *1,682*
850	Buxton Villa, Adelaide Street.	III.	—	1	—	3	3	—	—	—	1,971	*1,485*, *1,953* 1,978
851	8, Llandilo Street	III.	—	—	—	1	2	—	—	—	—	1,486
852	78, Adelaide Street	III.	—	—	2	4	2	—	—	—	1,487	—
853	50, India Road	III.	—	1	2	2	—	—	—	—	1,490	—
854	32, Alma Place	III.	—	1	4	1	2	—	—	1,493, 1,509	—	—
855	9, Nelson Street	III.	—	—	—	2	1	—	—	—	1,495, 1,818	—
856	Twin Cottage, Barton Street.	III.	—	1	5	2	2	—	—	1,497	—	1,655
857	9, Victoria Street	III.	—	—	1	—	3	—	—	1,496	—	1,559, *1,717*
858	20, Castle Street	III.	—	—	—	—	—	—	—	—	—	1,502
859	80, Sherborne Street	IV.	—	—	—	—	—	—	—	1,503	—	—
860	103, Barton Terrace	III.	—	—	—	—	—	—	—	—	1,504	—
861	Stanley Cottage, Barton Street.	III.	—	—	1	1	1	—	—	—	1,505	—
862	3, Alma Place	III.	—	—	3	2	—	—	—	*1,586*, 1,730	1,508, 1,712	—
863	56, Alma Place	III.	—	1	5	2	2	—	—	1,510, 1,548	—	—
864	31, Clegram Road	III.	—	—	1	3	2	—	—	—	1,526	—
865	51, Adelaide Street	III.	—	1	2	2	2	—	—	1,527, 1,528	1,736	1,714
866	78, Hare Lane	IV.	—	—	—	—	—	—	—	—	1,532	—
867	78, Milbrook Street	III.	—	—	1	—	2	—	—	—	—	1,529
868	9, Alma Place	III.	—	—	2	—	3	—	—	*1,535*, 1,740	—	—
869	4, Linden Terrace	III.	—	—	2	3	—	—	—	—	1,536	—
870	Bath Buildings, Stroud Road.	III.	—	—	—	—	—	—	—	—	—	1,537
871	Tory Cottage, Deacon Street.	II.	—	—	—	—	—	—	—	*1,542*	—	1,676, 1,694
872	Buliingdon Passage, Barton Street.	III.	—	—	—	—	—	—	—	*1,544*	—	—
873	81, New Street	III.	—	—	—	—	3	—	—	—	—	1,545
874	24, St. Paul's Road	III.	—	—	—	3	1	—	—	—	—	1,546
875	98, Alma Place	III.	1	—	—	3	—	*1,547*	—	—	1,708	—
876	13, Parkend Road	III.	—	—	—	1	2	—	—	—	—	1,549
877	Llanthony Cottage	III.	—	—	—	3	2	—	—	—	1,550	1,748
878	18, Russell Street	IV.	—	—	—	1	1	—	—	—	1,554	—
879	7, St. Luke Street	III.	—	1	4	1	3	—	—	—	—	1,557
880	37, Alma Place	III.	—	—	2	1	2	—	—	*1,558*	—	—
1,094	128, Lower Barton Street.	III.	—	—	—	—	—	—	—	—	1,954	—
1,095	1, Gothic Cottage, Barton Street.	III.	—	—	—	—	—	—	—	—	1,955	—
881	4, Alma Terrace	III.	—	—	2	1	1	—	—	1,562	—	—
882	6, New Street	III.	—	—	3	4	2	—	—	—	1,563	—
883	14, New Street	III.	—	—	3	1	2	—	—	—	—	1,564
884	16, Herbert Road	I.	—	—	—	2	—	—	—	—	1,565, *1,726*	—
885	24, Worrall Street	II.	—	—	—	—	2	—	—	—	—	1,567
886	14, Sebert Street	II.	—	—	—	1	2	—	—	—	—	1,568, 1,797
887	43, Sherborne Street	IV.	—	—	1	4	1	—	—	—	1,569	1,628
888	7, Twyver Street	I.	—	1	3	1	2	—	—	1,570	—	—
889	24, Victory Road	III.	—	—	—	—	—	—	—	—	—	1,571
890	1, Cecil Road	III.	—	—	4	—	2	—	—	—	—	1,572
891	Levi's Court, Westgate.	II.	—	—	—	—	—	—	—	—	—	1,573
892	84, Sherborne Street	IV.	—	—	—	—	—	—	—	—	—	1,574, 1,760
893	14, Herbert Road	I.	—	—	—	1	1	—	—	—	1,575	—
894	18, Worrall Street	II.	—	—	—	—	—	—	—	—	1,576	1,624

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
895	59, Barton Terrace	III.	—	—	4	2	2	—	—	1,583, *1,613* *1,683*, *1,742*	—	—
896	Knowles Road	III.	—	—	—	1	2	—	—	—	—	1,591
897	28, Lower Barton Street.	III.	—	—	—	1	2	—	—	—	—	*1,592*
899	45, Milbrook Street	III.	—	—	—	—	2	—	—	—	—	1,594
900	55, Alma Place	III.	—	—	4	1	2	—	—	1,585	—	—
902	121, Rycroft Street	III.	—	—	—	2	—	—	—	—	1,596	—
903	68, India Road	III.	—	—	—	—	—	—	—	—	1,597	—
904	57, St. Paul's Road	III.	—	—	4	—	2	—	—	1,598, 1,782 1,857, 1,858	—	—
905	31, Mitre Street	IV.	—	—	—	—	—	—	—	—	1,599	—
906	25, Nelson Street	III.	—	—	1	5	1	—	—	*1,600*	—	—
907	23, Alma Place	III.	—	1	1	1	1	—	—	—	1,602	—
908	6, Chapel Street, St. Mary's Square.	II.	—	—	3	2	2	—	—	1,721	1,603	—
909	14, Upton Street	III.	—	1	—	1	1	—	—	—	1,604	—
910	35, Worrall Street	II.	—	—	3	2	2	—	—	—	1,608	—
911	38, Philip Street	III.	—	—	—	2	2	—	—	—	—	1,609
913	18, Tredworth Road	III.	—	—	—	—	—	—	—	—	1,614	—
914	51, Parkend Road	III.	—	—	—	—	—	—	—	—	1,615	—
915	Brown's Lodging House, Longsmith Street.	IV.	—	—	—	—	—	—	—	—	1,617	—
916	12, Alma Place	III.	—	—	2	1	2	—	—	1,619	1,783	—
917	39, Theresa Street	III.	—	—	—	—	—	—	—	—	1,620	1,732
918	26, Salisbury Road	III.	—	—	—	2	2	—	—	—	1,622	—
919	Florence Villa, Clegram Road.	III.	—	—	—	1	2	—	—	—	—	1,623
920	Alexander Terrace, Clegram Road.	III.	—	—	3	—	2	—	—	—	—	1,625
921	15, Hare Lane	IV.	—	—	—	—	—	—	—	—	—	1,627
922	51, Philip Street	III.	—	—	1	4	2	—	—	—	—	1,629
923	31, Cecil Road	III.	—	—	—	1	1	—	—	—	—	1,630
924	46, Clifton Terrace	III.	—	—	3	2	2	—	—	1,786, 1,787 1,788	1,634	*1,631*
925	45A, Morton Street	III.	—	—	—	—	—	—	—	1,667	—	—
926	4, Massey Parade	III.	—	—	—	—	—	—	—	—	—	1,633
927	52, Melbourn Street	III.	—	—	1	3	—	—	—	—	*1,638*, 1,798	—
928	34, Robin Hood Street.	III.	—	—	—	1	1	—	—	—	1,640	—
929	13, Ducie Street	III.	—	—	—	—	—	—	—	*1,707*, 1,729 1,819, *1,820*	1,641	—
930	18, Sinope Street	III.	—	—	—	3	2	—	—	—	1,642	—
931	10, Stroud Road	III.	—	—	1	3	2	—	—	—	1,643	—
932	26, Worcester Street	IV.	—	—	3	5	2	—	—	1,745	1,779, 1,806	1,644, 1,674
933	14, Clement Street	III.	—	—	—	2	—	—	—	—	1,645, 1,697	—
934	Roath Villa, Clegram Road.	III.	—	1	2	I	2	—	—	*1,646*	1,785	—
935	22, Knowles Road	III.	—	—	—	—	—	—	—	—	*1,647*	—
936	116, Milbrook Street	III.	—	—	—	—	—	—	—	—	1,648, 1,764	—
937	106, Alma Place	III.	—	—	2	1	2	—	—	1,871, 1,938	—	1,652
938	34, Birchmore Road	I.	—	1	4	—	2	—	1,781	*1,653*	—	—
939	23, Princes Street	III.	—	—	—	—	—	—	—	*1,654*	—	—
941	2, Alfred Street	III.	—	1	1	1	3	—	—	—	—	*1,657*
942	30, Weston Road	III.	—	—	2	4	2	—	—	—	—	1,658
943	19, Rycroft Street	III.	—	—	1	3	1	—	—	1,659	—	—
945	114, Westgate	II.	—	—	—	—	—	—	—	—	1,663	—
946	58, Hopewell Street	III.	—	—	3	—	2	—	—	—	—	*1,664*
947	9, St. James' Street	III.	—	1	2	3	2	—	—	1,666	1,793	—
948	62, Alma Place	III.	—	—	—	2	—	—	—	—	1,669	—
949	21, Vauxhall Road	III.	—	1	1	—	2	—	—	—	—	*1,672*
950	39, Clement Street	III.	—	—	4	1	2	—	—	—	1,673	1,801
051	Union Workhouse	I	—	—	—	—	—	—	—	—	—	1,675
952	37, Twyver Street	I.	—	—	2	4	2	—	—	—	1,677, 1,737	—

XI.

May 10*th to May* 23*rd*.—The number of cases known to have arisen during this fortnight was 116. There were 49 new invasions of houses, again a decrease of one-half, and the number of cases that occurred in themwas 75, of whom 21 died.

32 houses yielded 1 case.
11 „ „ 2 „
4 „ „ 3 „
1 „ „ 4 „
1 „ „ 5 „

House 963.—Here the first to be attacked was the mother (aged 33), she was vaccinated, and had a confluent attack. She was nursing her unvaccinated infant at the time, and the child was actually in bed with its mother when the rash was out upon the latter. The mother's illness began on May 6th, the child's not until the 28th. The infant passed through a severe confluent attack. The attendant upon these cases was one of the young women referred to as assisting in the hydropathic treatment. She had attended other cases, but early in her sojourn at this house she had prodromal symptoms followed by an eruption which, I believe from its character, to have been variolous, although this was stoutly disputed by herself.

House 964. — This house was occupied by two young married couples. Three unvaccinated children (3 years and under), two belonging to one family and one to the other, died, and the father of the single child had a discrete attack. These cases were all retained at home.

House 965.—In this house five out of a family of nine were attacked. The house is in a rather thickly peopled part, and the owner resisted the attempt of the sanitary officials to remove the first case. As others fell ill he yielded, seeing the impossibility of nursing them at home. The four unvaccinated members of the family (aged 9 months to 17 years) were attacked, one dying at home from malignant small-pox; a lad of 18 (vaccinated) had a discrete attack.

House 992.—Here two unvaccinated children (8 and 3 years) died, two others under 10 were vaccinated on the appearance of small-pox, and there were four other vaccinated members of the family, one of whom, the father, was inoculated with small-pox by one of his sick children.

The 49 houses were situated in the districts as follows :—

1. Kingsholm - -	2	with	2 cases.
2. St. Nicholas - - -	1	,,	1 ,,
3. South Hamlet - -	40	,,	62 ,,
4. St. John Baptist - -	6	,,	10 ,,

The *age*-incidence of the 75 attacked in these houses was :—

1 month to 1 year - -	7 cases,	5 deaths.
1 to 10 years - - - -	23 ,,	12 ,,
10 to 30 years - - -	25 ,,	1 ,,
30 years and over - - -	20 ,,	3 ,,
	75	21

Of these 75 cases there were—

Removed to hospital 13, of whom 5 died.
Remained at home 62, of whom 16 died.

LIST OF HOUSES KNOWN TO BE INVADED BY SMALL-POX during the fortnight ending May 23rd, 1896.

[MAP 11.]

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
953	65, Linden Road -	III.	—	—	2	1	2	—	—	—	—	1,679
954	9, Clement Street -	III.	—	—	1	3	1	—	—	—	1,680	—
955	8, Havelock Terrace	III.	—	—	—	3	2	—	—	—	1,687	1,810
956	112, Melbourn Street	III.	—	—	4	2	2	—	—	*1,688*	—	—
957	29, Morpeth Street -	III.	—	—	—	—	—	—	*1,875*	—	1,689	—
959	11, Herbert Road -	I.	—	—	—	3	2	—	—	—	—	1,691
960	27, Victoria Street -	III.	—	—	—	—	—	—	—	—	—	1,693
961	12, Mitre Street -	IV.	—	—	—	4	1	—	—	—	1,696	—
962	" Wheatsheaf," Southgate	III.	—	—	—	—	—	—	—	—	1,690	—
963	60, Widden Street -	III.	—	1	—	1	4	—	1,822	—	1,873	1,703
964	42, Nelson Street -	III.	—	1	3	2	2	—	*1,706*	*1,811*, *1,812*	1,877	—
965	60, Suffolk Street -	IV.	—	1	3	3	2	—	*1,804*	1,711, *1,805* 1,807	1,803	—
966	88, New Street -	III.	—	—	1	3	2	—	—	—	1,715	—
967	31, Morpeth Street -	III.	—	1	1	2	3	—	—	—	—	1,716
968	3, Dainty Street -	III.	—	—	—	—	—	—	—	1,718, *1,794* 1,795	—	—
969	27, Clegram Road -	III.	—	—	2	4	2	—	—	*1,719*	—	1,839
970	6, Clifton Road -	III.	—	1	3	4	2	—	—	*1,773*	—	1,720
971	1, Alma Terrace -	III.	—	—	2	3	1	—	—	*1,723*, 1,840	—	—

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
972	33, Castle Street -	III.	—	1	1	1	1	—	—	—	—	1,724
973	76, Melbourn Street -	III.	—	—	2	—	2	—	—	—	—	1,727, 1,902
974	3, George's Row, Morton Street.	III.	—	—	1	—	2	—	—	—	—	1,728
975	3, Norman's Row, Quay Street.	II.	—	—	—	—	—	—	—	—	1,731	—
976	19, Twyver Street -	I.	—	—	3	2	—	—	—	—	*1,734*	—
977	3, Baker Street -	III.	—	—	2	1	1	—	—	1,817	1,738	—
978	10, Ducie Cottages -	III.	—	—	—	1	2	—	—	—	1.744	—
979	82, Northgate -	IV.	—	—	2	—	2	—	—	1,746	—	—
980	63, Barton Terrace -	III.	—	—	—	—	—	—	—	—	—	*1,747*
981	35, Alma Place -	III.	—	—	1	1	1	—	—	1,749	—	—
982	44, Derby Road -	III.	—	—	—	1	2	—	—	—	1,750	—
983	27, Wellesley Street -	III.	—	—	—	—	—	—	—	—	1,754	—
984	44, Morton Street -	III.	—	—	—	2	1	—	—	—	1,755	—
985	14, Victory Road -	III.	—	—	1	2	—	—	—	1,756	1,870	—
986	20, Hopewell Street -	III.	—	—	—	—	2	—	—	—	—	*1,757*
987	1, Alma Place -	III.	—	—	2	2	2	—	—	1,758, *1,867*	—	—
988	118, Melbourn Street	III.	—	1	1	3	—	—	—	—	1,759	—
989	6, Alfred Street -	III.	—	1	1	—	3	—	*1,761*	—	—	—
990	64, Moor Street -	III.	—	1	2	2	1	—	*1,763*	—	—	—
991	"King William" Inn, Alvin Street.	IV.	—	—	—	—	—	—	—	—	—	*1,766*
992	5, Knowles Road -	III.	—	—	4	2	2	—	—	*1,767, 1,868*	—	1,910
993	82, Regent Street -	III.	—	1	3	3	2	—	—	—	1,771	—
994	20, Charles Street -	III.	—	—	—	2	1	—	—	—	1,772	—
995	"Fernleigh," Linden Road.	III.	—	1	3	4	2	—	—	—	—	1,774
996	31, Alma Place -	III.	—	—	4	3	1	—	—	*1,808*	1,776	1,796
997	4, Victory Road -	III.	—	—	—	—	—	—	—	—	1,777	—
998	10, Alma Pace -	III.	—	1	1	—	1	—	1,976	—	—	1,778
999	10, Widden Street -	III.	—	1	1	2	2	—	—	1,789	—	1,876
1,000	27, Clement Street -	III.	—	—	—	4	—	—	—	—	1,790	—
1,001	8, Sherborne Street -	IV.	—	1	2	4	1	—	—	—	1,791	—
1,002	68, Sherborne Street	IV.	—	—	1	2	—	—	—	—	1,792	—

XII.

May 24th to June 6th.—During this fortnight there was an interruption of the previously rather rapid decline of the epidemic—for 105 cases came under notice, and as many as 58 houses were newly invaded. These houses yielded in all 82 cases, of which only nine were fatal, there being thus, in respect to fatality, a very marked improvement.

45 houses yielded 1 case.
8 ,, ,, 2 cases.
3 ,, ,, 3 ,,
2 ,, ,, 6 ,,

House 1,021.—In the same road (comparatively new, semi-detached villas) as the one just referred to (No. 992) and the next to be mentioned (No. 1,046). In this house several cases had occurred which were not notified at the time, but the death of one of these children (No. 1,831) drew the attention of the authorities to it. There were in all six attacked, including two vaccinated, and two who were "undergoing" vaccination, as well as two who had never been vaccinated. The cases of the vaccinated children (aged 16 and 17) were quite mild, and three of the others, with the exception of the fatal one, aged 9 months to 8 years, were of the coherent type. The parents and two children (vaccinated) escaped.

House 1,046.—Here, also, there were six attacked, the first being the maternal grandfather, aged 73, a subject of paralysis agitans, who was removed to hospital on June 3rd. The father and mother alone escaped, for all the children at ages ranging from 18 months to 11 years were attacked, three of them severely, and one, the youngest, fatally. The first cases were cared for at home, but as the later ones arose they were sent to the hospital.

The 58 houses invaded during this fortnight were situated in:—

1. Kingsholm - - - 6 houses, with 8 cases.
2. St. Nicholas - - 3 ,, ,, 4 ,,
3. South Hamlet - - - 45 ,, ,, 62 ,,
4. St. John Baptist - - 4 ,, ,, 8 ,,

The *age*-incidence of those attacked in them was :—

1 month to 1 year - -	2 cases,	1 death.
1 to 10 years - - - -	14 „	3 „
10 to 30 years - - -	38 „	2 „
30 and over - - - -	28 „	3 „
	82	9

Of these 82 cases there were—

Removed to hospital 20, of whom 4 died.
Remained at home 62, of whom 5 died.

LIST OF HOUSES KNOWN TO BE INVADED BY SMALL-POX during the fortnight ending June 6th, 1896.

[MAP 12.]

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
958	Ship "George," Docks.	IV.	—	—	—	—	—	—	—	—	510	—
1,003	Gardner's Row, Kingsholm.	II.	—	—	2	1	2	—	—	—	—	1,799
1,004	Alexandra Villas, Clegram Road.	III.	—	—	1	—	2	—	—	—	—	*1,800*
1,005	1, Massey Parade -	III.	—	—	3	4	2	—	—	817, 1,374, 1,606	—	—
1,006	16, Alma Place -	III.	—	—	—	2	—	—	—	—	1,809	—
1,007	2, Massey Parade -	III.	—	—	—	1	2	—	—	—	—	1,813
1,008	27, Moor Street -	III.	—	—	—	—	—	—	—	—	1,770	—
1,009	100, New Street -	III.	—	—	1	1	1	—	—	1,802	1,905	—
1,010	33, Moor Street -	III.	—	—	—	—	—	—	—	—	*1,814*	—
1,011	11, Alma Place -	III.	—	—	—	—	2	—	—	—	—	1,815
1,012	12, Linden Road -	III.	—	1	—	2	—	—	—	—	1,816	—
1,013	2, Sinope Street -	III.	—	—	2	—	2	—	—	—	—	1,823
1,014	19, Sidney Street -	I.	—	—	2	3	2	—	—	—	1,824	—
1,015	28, Victoria Street -	III.	—	—	—	—	—	—	—	—	*1,825*	—
1,016	110, Melbourn Street	III.	—	—	1	6	4	—	—	—	—	1,826
1,017	21, Dynevor Street -	III.	—	—	—	3	1	—	—	—	1,827	—
1,018	20, Worrall Street -	II.	—	—	—	2	—	—	—	—	1,828	—
1,019	2, Herbert Road -	I.	—	—	4	2	2	—	—	—	—	1,829
1,020	16, Carmarthen Street	III.	—	—	—	2	—	—	—	—	1,830	—
1,021	6, Knowles Road -	III.	—	1	3	4	2	—	1,833	*1,831*, 1,832 1,946	1,947, 1,948	—
1,022	34, Derby Road -	III.	—	—	—	—	—	—	—	—	—	*1,834*
1,023	16, Hethersett Road	III.	—	—	3	4	1	—	—	1,835	1,922	—
1,024	7, Magdala Road -	III.	—	—	—	2	1	—	—	—	1,836	—
1,025	4, Sweetbriar Street	IV.	—	—	1	5	2	—	—	—	1,916, 1,963	1,837
1,026	106, Alfred Street -	I.	—	—	—	1	1	—	—	—	1,920	1,838
1,027	19, Magdala Road -	III.	—	—	—	—	—	—	—	—	1,784	—
1,028	11, Cecil Road -	III.	—	1	1	2	—	—	—	—	1,841	—
1,029	36, Albany Street -	III.	—	—	—	—	2	—	—	—	—	1,842
1,030	11, Charles Street -	III.	—	—	—	—	—	—	—	—	—	1,843
1,031	59, Suffolk Street -	IV.	—	—	—	—	—	—	—	*1,879*	—	*1,844*
1,032	24, Jersey Road -	III.	—	—	—	1	2	—	—	—	—	1,847
1,033	21, India Road -	III.	—	1	—	1	1	—	—	—	1,848	—
1,034	114, Melbourn Street	III.	—	—	—	5	2	—	—	—	1,849	—
1,035	6, George's Row, Morton Street.	III.	—	1	1	2	—	—	—	—	1,850	—
1,036	13, Sherborne Street	IV.	—	—	—	—	—	—	—	—	1,851	1,915
1,037	65, Upton Street -	III.	—	—	—	—	—	—	—	—	1,852	—
1,038	"Homelands," Lower Barton Street.	III.	—	—	1	7	3	—	—	—	1,853, 1,861	—
1,039	11, Dainty Street -	III.	—	1	—	2	—	—	—	—	1,854	—
1,040	5, George's Row, Morton Street.	III.	—	—	—	—	—	—	—	—	1,855	—
1,041	47, Brook Street -	III.	—	—	1	2	2	—	—	—	—	1,856
1,042	16, Twyver Street -	I.	—	—	2	1	2	—	—	—	—	1,959, 1,925
1,043	4, Counsel Street -	II.	—	—	—	—	—	—	—	1,860	1,945	—
1,044	30, Birchmore Road	I.	—	—	—	3	1	—	—	—	—	1,862
1,045	5, Albert Street -	III.	—	—	—	—	—	—	—	—	1,863	—
1,046	24, Knowles Road -	III.	—	—	4	1	3	—	—	1,899, 1,928, 1,935, *1,940*	1,937	1,864
1,047	121, High Street -	III.	—	—	—	—	—	—	—	—	—	1,865
1,048	7, Birchmore Road -	I.	—	1	2	1	1	—	—	—	1,866	—

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
1,049	St. Ann's Terrace, Seymour Road.	III.	—	—	—	4	3	—	—	—	1,869, 1,883	1,882
1,050	55, Ducie Street -	III.	—	—	—	2	—	—	—	—	1,872	—
1,051	4, Clare Terrace, Clegram Road.	III.	—	1	—	2	—	—	1,874	—	—	—
1,052	122, Melbourn Street	III.	—	—	1	4	2	—	—	—	—	1,880
1,053	59, Tredworth Road -	III.	—	—	—	2	2	—	—	—	—	1,881
1,054	57, Brook Street -	III.	—	—	—	—	—	—	—	—	—	1,884
1,055	45, Rycroft Street -	III.	—	—	1	2	1	—	—	—	—	1,885
1,056	76, Milbrook Street -	III.	—	—	—	—	2	—	—	—	—	1,886
1,057	5, Derby Road -	III.	—	—	—	—	—	—	—	—	1,887	—
1,058	51, Alma Place -	III.	—	—	—	1	2	—	—	—	1,888	—
1,059	117, High Street -	III.	—	—	—	2	2	—	—	—	—	1,890

XIII.

June 7th to June 20th.—The notifications now fell to two to four daily, the total number of cases known during the fortnight being 36. There were 20 new invasions; 29 cases arising in these houses, 7 of them fatal.

17 houses yielded 1 case.
2 ,, ,, 2 cases.
1 ,, ,, 8 ,,

Reference may be made to the last-mentioned.

House 1,064.—Eight out of the nine members of this family were attacked, and the cases of several of them were not notified. Five of them were retained at home, three sent to hospital. Three died, viz., unvaccinated children, aged 3, 4, and 7 respectively; two other unvaccinated children were also attacked, the youngest, aged 14 months, having the least severe attack. The father and a daughter of 13 had mild attacks, the mother also a very mild (inoculated) attack. They had been vaccinated in infancy, as also was another daughter, aged 16, who was the only one to escape.

These houses were situated in :—

1. Kingsholm - -	1 house,	with	1 case.
2. S. Nicholas - - -	1 ,,	,,	1 ,,
3. South Hamlet - -	17 ,,	,,	26 ,,
4. St. John Baptist - -	1 ,,	,,	1 ,,

The *age*-incidence of the 29 cases was : —

1 to 10 years - - -	9 cases,	4 deaths.
10 to 30 years - - -	9 ,,	—
30 and over - - -	11 ,,	3 ,,
	29	7

Of these cases there were—

Removed to hospital 15, of whom 1 died.
Remained at home 14, of whom 6 died.

LIST OF HOUSES KNOWN TO BE INVADED BY SMALL-POX during the Fortnight ending June 20th, 1896.

[MAP 13.]

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
1,060	4, Exhibition Street -	III.	—	—	—	—	—	—	—	—	—	1,891
1,061	10, Dynevor Street -	III.	—	—	4	—	2	—	—	—	—	1,892
1,062	33, Clegram Road -	III.	—	—	—	—	—	—	—	—	—	*1,893*
1,063	94, Alma Place -	III.	—	—	1	3	1	—	—	—	1,894	—
1,064	74, India Road -	III.	—	—	5	2	2	—	—	1,895, *1,897* *1,898*, *1,906* 1,912.	1,907	1,908, 1,909
1,065	122, High Street -	III.	—	—	—	—	—	—	—	1,896	—	—
1,066	Worrall Court -	II.	—	—	2	2	2	—	—	*1,900*	—	—
1,067	15, Albert Street -	III.	—	—	5	1	2	—	—	—	—	*1,901*
1,068	16, Paul Street -	III.	—	—	—	—	—	—	—	—	1,904	*1,969*
1,069	8, Paul Street -	III.	—	—	—	—	—	—	—	—	—	1,911
1,070	80, New Street -	III.	—	—	1	2	1	—	—	—	—	1,914
1,071	7, Seymour Road -	III.	—	—	—	—	—	—	—	—	—	1,917
1,072	28, Windmill Parade	I.	—	—	—	—	—	—	—	—	1,918	—
1,073	82, Milbrook Street -	III.	—	—	—	—	—	—	—	—	1,921	—
1,074	1, Clement Cottages	III.	—	—	—	—	—	—	—	—	1,923	—
1,075	15, Magdala Road -	III.	—	—	—	—	—	—	—	—	1,924	—
1,076	6, Dainty Street -	III.	—	—	3	2	—	—	—	1,926	—	—
1,077	48, Barton Terrace -	III.	—	—	—	—	—	—	—	—	1,927	1,967
1,079	3, Parliament Street	IV.	—	—	—	—	—	—	—	—	1,930	—
1,080	Wildmans Court, Barton Street.	III.	—	—	—	—	—	—	—	1,931	—	—

XIV.

June 24th to July 4th.—During this fortnight there was a comparatively slight fall from the previous one, 36 cases coming to the knowledge of the authorities, and more occurring towards the end of the fortnight than at the beginning. There were 20 houses newly invaded, precisely the same as in the preceding two weeks. There occurred in these houses 23 cases, of which 2 were fatal.

17 houses yielded 1 case.
3 „ „ 2 cases.

The houses were situated in—

1. Kingsholm - -	2 houses,	with 2 cases.
2. S. Nicholas - -	3 „	„ 4 „
3. South Hamlet - -	13 „	„ 15 „
4. St. John Baptist - -	2 „	„ 2 „

The *age*-incidence of the 23 attacks was:—

1 to 10 years - - -	2 cases.	
10 to 30 years - - -	10 „	
30 and over - - -	11 „	2 deaths.
	23	2

Of these 23 cases there were—
Removed to hospital 7, of whom 2 died.
Remained at home 16, of whom none died.

LIST OF HOUSES KNOWN TO BE INVADED BY SMALL-POX during the Fortnight ending July 4th, 1896.

[MAP 14.]

No. in House List.	Address.	District	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
1,078	15, Percy Street -	III.	—	—	1	3	2	—	—	—	—	1,962
1,081	Sudbrook House, Southgate.	III.	—	—	—	—	—	—	—	—	—	1,932
1,082	115, High Street -	III.	—	—	—	1	1	—	—	—	—	1,933
1,083	7, Alma Place -	III.	—	—	—	2	2	—	—	—	1,934	—
1,084	12, Cecil Road -	III.	—	—	1	2	—	—	—	—	1,936	—
1,085	Rock Villa, Falkner Street.	III.	—	—	—	—	—	—	—	—	1,939	—
1,086	29, Birchmore Road	I.	—	—	—	—	—	—	—	—	—	1,941
1,087	10, Herbert Road -	I.	—	—	—	—	—	—	—	—	1,942	—
1,088	22, Sherborne Street	IV.	—	1	—	2	—	—	—	—	1,943	—
1,089	25, Magdala Terrace	III.	—	1	3	1	2	—	—	—	—	1,944
1,090	2, Worrall Court -	II.	—	—	—	2	—	—	—	—	1,949	—
1,091	3, Worrall Street -	II.	—	—	—	1	1	—	—	—	1,950	1,972
1,092	2, Clifton Road -	III.	—	—	—	—	—	—	—	—	—	*1,951*
1,093	60, Adelaide Street -	III.	—	—	2	2	2	—	—	—	1,952	—
1,096	15, Counsel Street -	II.	—	—	—	—	—	—	—	—	1,959	—
1,097	142, Melbourn Street	III.	—	—	1	2	2	—	—	—	—	1,960
1,098	24, Alma Place -	III.	—	—	3	2	2	—	—	1,961	—	—
1,099	63, New Street -	III.	—	—	—	—	2	—	—	—	—	1,964, *1,979*
1,100	21, Sweetbriar Street	IV.	—	—	—	—	—	—	—	—	—	1,965
1,101	Whitehouse Passage, Barton Street.	III.	—	—	—	—	—	—	—	1,966	1,968	—

XV.

July 4th to July 18th.—The decline which now took place was somewhat remarkable. The disease had retained its footing during the hot dry weather that occurred in the month of June, although with notably diminished fatality, as well as a diminution in the number of cases arising in separate families. During this fortnight, however, it nearly ceased, for on nine almost consecutive days there had been no cases notified. The total amounted to eight cases, whilst only four new houses were invaded, yielding four cases, with one death. One of these houses was in the Kingsholm district and three in the South Hamlet.

The *age*-incidence of the four cases was :—

10 to 30 years - -	3 cases,	1 death.
30 and over - - -	1 case.	
	4	1

Of these 4 cases there were—

Removed to hospital 3, of whom 1 died.

Remained at home 1, of whom none died.

LIST OF HOUSES KNOWN TO BE INVADED BY SMALL-POX during the Fortnight ending July 18th, 1896.

[MAP 15.]

No. in House List.	Address.	District.	Inmates.					Cases.				
			1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.	1 Month and under.	1 Month to 1 Year.	1 to 10.	10 to 30.	30 and over.
1,102	76, Alfred Street -	I.	—	—	—	—	—	—	—	—	1,970	—
1,103	17, Percy Street -	III.	—	—	—	—	—	—	—	—	—	1,973
1,104	32, Melbourn Street -	III.	—	—	—	—	—	—	—	—	1,974	—
1,105	Elmstone Villa, Morpeth Street.	III.	—	—	—	—	—	—	—	—	1,975	—

I have thus attempted to give some idea of the course taken by this epidemic which can also be followed upon the series of maps that illustrate it.

It may be useful if, before referring to two subjects of much interest, viz., the invasion of the public elementary schools, and the comparison between the cases removed to hospital and those remaining at home, I can summarise the figures which are given under each of the 15 sections just described.

The cases known (to me) to have occurred during the whole period of 58 weeks, amount to 1,979, of which 23 arose in 1895, 56 in January, 1896, 145 in February, 604 in March, 733 in April, 283 in May, 122 in June, and 13 in July.*

The distribution of the infected houses during the whole period will be found to have been as follows :—

1. Kingsholm - -	51 houses,	yielding	90 cases.
2. St. Nicholas - - -	45 ,,	,,	64 ,,
3. South Hamlet - -	933 ,,	,,	1,715 ,,
4. St. John Baptist - -	69 ,,	,,	110 ,,
	1,098		1,979

There were 434 deaths.

Distributed according to their *age*-incidence there were :—

1 month and under - -	22 cases,	21 deaths.
1 month to one year - -	63 ,,	40 ,,
1 to 10 years - - -	621 ,,	219 ,,
10 to 30 ,, - - -	702 ,,	56 ,,
30 and over - - -	571 ,,	98 ,,
	1,979	434

These cases came from 1,098 houses, viz. :—

666	houses yielded each	1 case	= 666 cases.
226	,, ,,	2 cases	= 452 ,,
94	,, ,,	3 ,,	= 282 ,,
44	,, ,,	4 ,,	= 176 ,,
37	,, ,,	5 ,,	= 185 ,,
16	,, ,,	6 ,,	= 96 ,,
7	,, ,,	7 ,,	= 49 ,,
4	,, ,,	8 ,,	= 32 ,,
2	,, ,,	9 ,,	= 18 ,,
1	,, ,,	11 ,,	= 11 ,,
1	,, ,,	12 ,,	= 12 ,,
1,098			1,979

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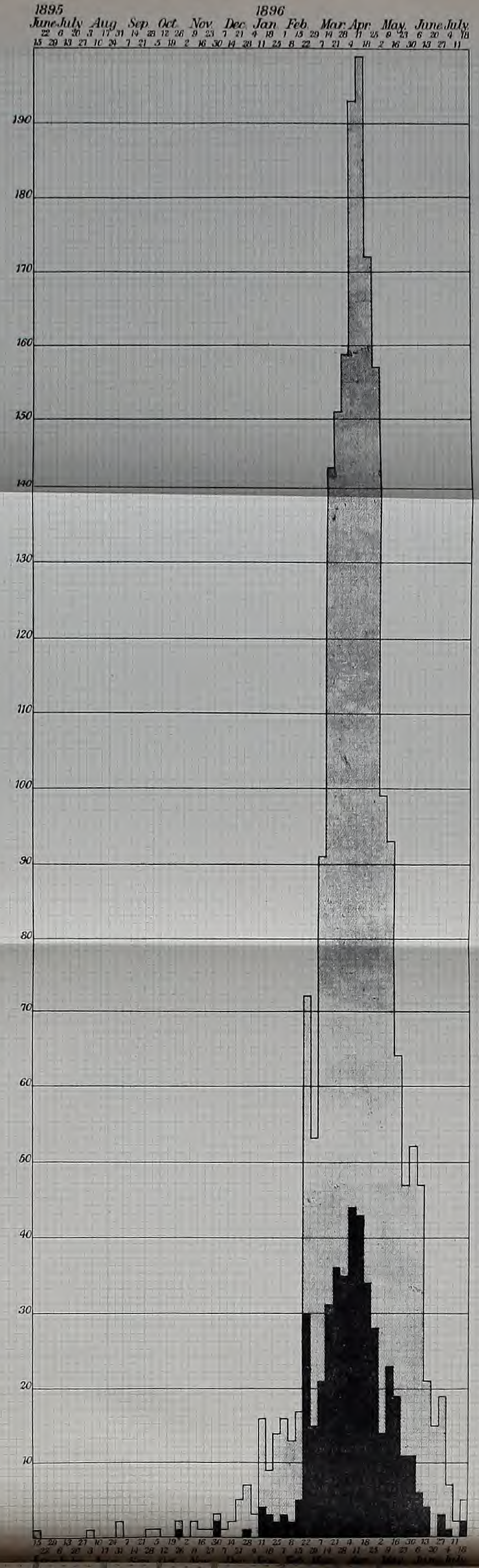
* Since the date (July 18th), at which this report closes, three other cases have occurred, none of them fatal. The last was notified on July 25th.



Weekly Incidence of Small Pox from June 15 1895, to July 18 1896.

To face page 169.

Thus the proportion of households in which there was only a single case of small-pox to those in which there were two or more was as 666 : 432, or 1·5 : 1. The *deaths* occurred amongst members of 336 households, or more than one-fourth of those invaded, and in 66 of them more than 1 death occurred, viz., 44 with 2 deaths, 15 with 3 deaths, 5 with 4 deaths, 1 with 5 deaths, and 1 with 6 deaths.

The Table of Cases which follows has not been compiled in strict chronological order, and this for several reasons. It was drawn up and added to as fresh cases were notified, but cases were inserted which, on visiting the houses, were found to have escaped notification. Again, the order of notification does not strictly conform to the serial order of attacks, as sometimes notification was unduly delayed.

The preceding fortnightly lists of invaded houses were also prepared according to the order of notifications, and do not actually represent the order of their invasion; and, of course, the same applies to the maps.

Nor do I possess full data of the precise onset of illness of every person attacked. Such as I have obtained are given in the Table of Cases, and from them (using the date of appearance of the rash) I have prepared the following weekly list, employing the dates of notification when those of the rash were lacking (*see* Plate III).

TABLE OF WEEKLY INCIDENCE OF CASES OF SMALL-POX.

Week ending	Cases.	Deaths.	Week ending	Cases.	Deaths.
1895.			1896.		
June 15	1	—	January 4	3	—
" 22	—	—	" 11	16	4
" 29	—	—	" 18	9	3
July 6	—	—	" 25	14	2
" 13	—	—	February 1	16	3
" 20	—	—	" 8	13	2
" 27	—	—	" 15	17	5
August 3	1	—	" 22	72	30
" 10	—	—	" 29	53	15
" 17	—	—	March 7	91	21
" 24	—	—	" 14	143	31
" 31	2	—	" 21	151	36
September 7	—	—	" 28	159	35
" 14	—	—	April 4	193	44
" 21	—	—	" 11	199	43
" 28	1	—	" 18	172	34
October 5	1	—	" 25	157	28
" 12	—	—	May 2	99	14
" 19	—	—	" 9	93	23
" 26	2	1	" 16	64	19
November 2	—	—	" 23	47	11
" 9	2	—	" 30	52	11
" 16	1	—	June 7	47	6
" 23	1	—	" 14	21	4
" 30	3	2	" 21	15	—
December 7	1	—	" 28	19	3
" 14	2	—	July 4	7	1
" 21	5	—	" 11	2	—
" 28	7	1	" 18	5	2
				1,979	434

N.B.—In this table the "deaths" refer to those of persons who were attacked in the respective weeks, and not to the numbers registered weekly.

TABLE OF CASES OF SMALL-POX.

No.	Name and Notification Number.	Sex.	Age.	Date of				Type of Attack.	Result.	Date of Death.	Vaccination.		Re-vaccination Date.	Remarks.	No. in House Register.
				Notification.	Onset.	Rash.	Removal to Hospital.				Date.	No. of Marks.			
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1	1324 J. P.	M.	30	1895. June 15	—	—	June 15	Mild	Rec.	—	Infancy	—	—	——	1
2	1340 — M.	M.	24	Aug. 2	—	—	Aug. 2	Confluent	,,	—	?	—	—	In employ of Mr. B. of Midland Road, whose daughter had small-pox shortly before (not notified).	2
3	1349 W. S.	M.	20	,, 28	—	—	,, 28	Mild	,,	—	Inf.	—	—	——	3
4	1351 W. A. G.	M.	25	,, 30	—	—	,, 30	Mild	,,	—	Inf.	—	—	——	4
5	1362 E. G.	F.	16	Sept. 28	—	—	Sept. 28	Confluent	,,	—	Unvaccinated.		—	——	5
6	1364 — K.	F.	1	Oct. 1	—	—	Oct. 1	Confluent	,,	—	Unvaccinated.		—	——	6
7	1379 L. B.	F.	25	,, 23	—	—	,, 23	Confluent	,,	—	Inf.	—	—	——	7
8	— E. M.	F.	8	—	Oct. 21	Oct. 23	—	Malignant	D.	Oct. 27	Unvaccinated.		—	Notified as "malignant measles," attended Widden Street School; companion to sister of No. 5.	8
9	1383 K. M.	F.	17	Nov. 7	Nov. 5	Nov. 7	Nov. 7	Mild	Rec.	—	Inf.	—	—	——	8
10	1384 D. M.	F.	5	,, 7	,, 3	,, 4	,, 7	Confluent	,,	—	Unvaccinated.		—	——	8
11	1390 A. L. M.	F.	30	,, 12	—	—	,, 12	Mild	,,	—	Inf.	—	—	——	9
12	1392 J. M.	M.	40	,, 20	Nov. 19	Nov. 20	,, 20	Discrete	,,	—	Inf.	—	—	——	8
13	1398 A. K. W.	F.	17	,, 27	—	—	,, 27	Confluent	D.	Dec. 12	Unvaccinated.		—	——	10
14	1399 K. G.	M.	4	,, 29	—	—	,, 29	Confluent	D.	,, 25	Unvaccinated.		—	Contracted in hospital	11
15	1400 F. G.	F.	15	,, 29	—	—	,, 29	Mild	Rec.	—	Inf.	—	—	——	12
16	1406 E. L.	F.	14	Dec. 8	—	—	Dec. 8	Mild	,,	—	Inf.	—	—	——	13
17	1409 C. W.	F.	19	,, 12	—	—	,, 12	Mild	,,	—	Inf.	—	—	——	10
18	1416 J. N.	M.	42	,, 18	—	—	,, 18	Mild	,,	—	Inf.	—	—	——	14
19	1417 F. S.	M.	7	,, 20	—	—	,, 20	Confluent	,,	—	Unvaccinated.		—	——	15
20	1418 K. H.	F.	24	,, 21	—	—	,, 21	Mild	,,	—	Inf.	—	—	——	16
21	1419 A. H.	F.	19	,, 22	Nov. 21	Nov. 22	,, 22	Discrete	,,	—	Inf.	—	—	——	17
22	1420 K. B.	F.	25	,, 23	—	—	,, 23	Mild	,,	—	Inf.	—	—	——	18
23	1421 J. H.	F.	1/12	,, 23	—	—	—	Confluent	D.	Dec. 24	Unvaccinated.		—	——	19
24	1422 E. B.	M.	23	,, 24	—	—	Dec. 24	Discrete	Rec.	—	Inf.	—	—	——	20
25	1423 F. W.	F.	12	,, 25	—	—	,, 25	Confluent	,,	—	Unvaccinated.		—	——	21
26	1425 J. M.*	F.	40	,, 26	Nov. 24	Nov. 26	,, 26	Discrete	,,	—	Inf.	—	—	——	22
27	1426 J. N. V.	M.	25	,, 27	—	—	,, 27	Mild	,,	—	Inf.	—	—	——	23
28	1428 A. H.	F.	14	1896. Jan. 1	Nov. 30	—	Jan. 1	Mild	,,	—	Inf.	—	—	——	17
29	— A. H.	F.	2	—	Early in Dec.		—	Mild	,,	—	Unvaccinated.		—	——	19
30	— R. H.	F.	21	—	About Dec. 20.		—	Mild	,,	—	Inf.	—	—	——	19
31	— A. L.	M.	18	—	,,	,,	—	Mild	,,	—	Inf.	—	—	——	19
32	1429 H. S.	M.	29	Jan. 4	—	—	Jan. 4	Discrete	,,	—	Inf.	—	—	——	24
33	1430 J. H.	F.	26	,, 4	—	—	,, 4	Discrete	,,	—	Inf.	—	—	——	25
34	1431 S. W.	M.	8	,, 6	—	—	,, 6	Confluent	,,	—	Unvaccinated.		—	——	21

35	1432	F. W.	M.	6	Jan. 6	—	—	Jan. 6	Confluent	”	—	Unvaccinated		—	——	21
36	1433	W. W.	M.	16	” 7	—	—	” 7	Confluent	”	—	Unvacciuated		—	——	21
37	1434	A. A.	F.	44	” 7	Jan. 1	Jau. 4	” 7	Confluent	D.	Jan. 16	Inf.	—	—	——	26
38	1435	M. C.	F.	7	” 8	” 6	” 8	” 8	Confluent	Rec.	—	Unvaccinated		—	——	27
39	1436	W. W.	F.	47	” 8	—	—	” 8	Mild	”	—	Inf.	—	—	——	21
40	1437	E. M.	F.	23	” 8	—	—	” 8	Mild	”	—	Inf.	—	—	——	28
41	1438	J. L.	F.	37	” 9	—	—	” 9	Confluent	D.	Jan. 13	Inf.	—	—	——	29
42	1439	F. L.	F.	8	” 9	—	—	” 9	Confluent	Rec.	—	Unvaccinated		—	——	29
43	1440	A. M.	M.	$1\frac{6}{12}$	” 10	—	—	” 10	Confluent	”	—	Unvaccinated		—	——	36
44	1441	W. H.	M.	3	” 10	Jan. 7	Jan. 9	” 10	Mild	”	—	Unvaccinated		—	——	16
45	1442	F. B.	F.	18	” 11	” 9	” 11	” 11	Mild	”	—	Iuf.	—	—	——	30
46	1443	F. H.	M.	$\frac{7}{12}$	” 11	—	—	” 11	Confluent	D.	Jan. 18	Unvacciuated		—	——	31
47	1444	N. H.	F.	3	” 11	—	—	” 11	Confluent	Rec.	—	Unvaccinated		—	——	31
48	1445	G. C.	M.	8	” 11	—	—	” 11	Confluent	D.	Jan. 15	Unvaccinated		—	——	32
49	1446	W. McK.	M.	48	” 11	—	—	—	Coufluent	Rec.	—	Unvaccinated		—	——	33
50	1447	G. C.	F.	4	” 13	—	—	Jan. 13	Coufluent	”	—	Unvaccinated		—	——	32
51	1448	W. H.	M.	5	” 13	—	—	” 13	Confluent	”	—	Unvaccinated		—	——	31
52	1449	J. T.	M.	17	” 14	—	—	” 14	Discrete	”	—	Inf.	—	—	——	35
53	1450	J. S.	F.	3	” 15	—	—	” 15	Confluent	”	—	Unvaccinated		—	——	15
54	1451	F. T.	M.	32	” 15	Jan. 12	Jan. 14	” 15	Confluent	”	—	Inf.	--	—	——	37
55	1452	L. V.	M.	2	” 15	—	—	” 15	Confluent	D.	Jan. 19	Unvaccinated		—	——	23
56	1453	H. L.	M.	31	” 16	—	—	” 16	Confluent	D.	” 22	Inf.	—	—	——	38
57	1454	A. T.	M.	1	” 12	—	—	” 12	Confluent	D.	” 16	Unvaccinated		—	——	34
58	1455	E. C.	F.	5	” 18	—	—	” 18	Discrete	Rec.	—	Unvaccinated		—	——	39
59	1456	H. K.	M.	20	” 20	—	—	” 20	Mild	”	—	Inf.	—	—	——	40
60	1457	A. P.	M.	17	” 21	—	—	” 21	Discrete	”	—	Inf.	—	—	Son of A. P., aged 50, who was attacked with small-pox, and case notified (No. 1,463) from the ship "Hero." Not included in this Return at first, but has since been inserted (*see* No. 1,977, *infra*).	41
61	1458	H. L.	M.	16	” 21	—	—	” 21	Mild	”	—	Inf.	—	—	——	29
62	1459	S. M.	M.	$\frac{10}{12}$	” 22	—	—	” 22	Confluent	D.	Jan. 26	Unvaccinated		—	——	36
63	1460	M. M.	F.	31	” 22	—	—	” 22	Discrete	Rec.	—	Inf.	—	—	——	36
64	1461	G. M.	M.	36	” 22	—	—	” 22	Conflueut	”	—	Alleged: no marks		—	——	36
65	1462	W. M.	M.	4	” 22	—	—	” 22	Confluent	”	—	Unvaccinated		—	——	36
66	1464	W. J.	M.	43	” 24	Jan. 22	Jan. 24	” 25	Discrete	”	—	Inf.	2 faiut	—	——	42
67	1465	C. B.	F.	36	” 25	” 23	” 25	” 26	Mild	”	—	Inf.	2 faiut	—	——	7
68	1466	F. T.	M.	3	” 25	” 22	” 24	” 26	Confluent	”	—	Unvaccinated		—	——	34
69	1467	D. T.	F.	3	” 25	” 22	” 24	” 26	Confluent	”	—	Unvaccinated		—	——	34
70	1468	W. T.	M.	8	” 25	” 22	” 24	” 26	Mild	”	—	Recent, abt. 7 days.	4 vesicles	—	Remains of lupus on neck and limbs.	34
71	1470	E. B.	F.	6	” 26	” 23	” 25	” 26	Malignant	D.	Jan. 28	Unvaccinated		—	——	30
72	1471	J. C.	M.	17	” 27	” 24	” 26	” 28	Discrete	Rec.	—	Inf.	4 plain	—	——	43
73	1472	W. K.	M.	35	” 28	” 25	” 27	” 28	Confluent	”	—	Inf.	2 plain	—	——	44
74	1473	E. W.	F.	46	” 29	” 27	” 29	” 29	Malignant	D.	Feb. 4	Inf.	2 plain	—	——	45
75	1474	A. C.	M.	4	” 30	” 27	” 29	” 30	Confluent	Rec.	—	Unvacciuated		—	Abscess on eyelid	39
76	1477	F. S.	M.	38	” 31	” 28	” 30	” 31	Confluent	D.	Feb. 7	Inf.	1 indistinct scar.	—	Severe delirium	46
77	1478	G. S.	M.	$2\frac{4}{12}$	” 31	” 29	” 31	” 31	Mild	Rec.	—	Inf.	3 faint	—	——	40
78	1479	G.P.	F.	37	” 31	” 29	” 31	Feb. 1	Confluent	”	—	Inf.	2 faiut	—	——	47
79	1480	G. T.	M.	7	Feb. 1	” 29	” 31	” 1	Discrete	”	—	Unvaccinated		—	——	35
80	1481	L. B.	F.	2	” 1	” 30	Feb. 1	” 1	Confluent	”	—	Unvaccinated		—	Delirium	48

* Committed suicide three days after return home.

No.	Name and Notification Number.	Sex.	Age.	Date of				Type of Attack.	Result.	Date of Death.	Vaccination.		Re-vaccination Date.	Remarks.	No. in House Register.
				Notification.	Onset.	Rash.	Removal to Hospital.				Date.	No. of Marks.			
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
81	1482 M. T.	F.	53	1896. Feb. 1	Jan. 28	Jan. 30	Feb. 1	Coherent	Rec.	—	Inf.	3 faint	—	——	49
82	1483 M. S.	F.	19	„ 2	„ 30	Feb. 1	„ 2	Mild	„	—	Inf.	4 plain, large.	2 years ago	Pregnant 4½ months. [Child subsequently born alive.]	50
83	1484 F. G. E.	M.	32	„ 3	Feb. 1	„ 3	„ 4	Mild	„	—	Inf.	1 faint	—	——	51
84	1485 A. P.	F.	12	„ 3	„ 2	„ 4	„ 4	Mild	„	—	Inf.	4 plain	Attempted 3 days before admission; no result.	Sister of No. 60	41
85	1486 B. S.	F.	20	„ 3	Jan. 29	Jan. 31	„ 3	Discrete	„	—	Inf.	4 plain	—	——	52
86	1487 S M.	F.	49	„ 3	Feb. 1	Feb. 3	„ 4	Malignant	D.	Feb. 26	Inf.	3 plain	20 years ago, but did not take; 2 attempts.	Pulmonary hæmorrage	53
87	1488 G. P.	F.	9	„ 3	„ 1	„ 3	—	Confluent	Rec.	—	Unvaccinated		—	——	54
88	1489 G. E. O.	M.	23	„ 3	„ 1	„ 3	—	Mild	„	—	Inf.	—	—	——	55
89	1490 B. W.	F.	9	„ 4	„ 1	„ 3	Feb. 4	Confluent	„	—	Unvaccinated		—	——	56
90	1491 R. M.	F.	38	„ 4	Jan. 30	„ 1	„ 4	Confluent	D.	Feb. 10	Inf.	3 very faint.	—	Severe delirium	57
91	1492 R. B.	M.	34	„ 4	„ 31	„ 2	„ 5	Confluent	Rec.	—	Inf.	2 faint	—	Severe delirium. Abscess on arm.	58
92	1493 M. A. M'C.	F.	25	„ 4	Feb. 1	„ 3	„ 5	Discrete	„	—	Inf.	3 plain	—	——	59
93	1494 M. L.	F.	53	„ 5	„ 2	„ 4	„ 5	Mild	„	—	Inf.	3 faint	In youth	——	60
94	1495 — S.	F.	36	„ 5	—	—	—	Mild	„	—	Inf.	—	—	——	62
95	1496 F. T. C.	M.	13	„ 7	Feb. 3	Feb. 5	Feb. 7	Confluent	„	—	Unvaccinated		—	——	63
96	1497 H. M.	M.	7	„ 7	„ 2	„ 4	„ 7	Confluent	„	—	Unvaccinated		—	——	64
97	1498 A. S.	F.	25	„ 4	Jan. 29	Jan. 31	„ 4	Mild	„	—	Inf.	4 faint	—	——	61
98	1500 N. S.	F.	7	„ 8	Feb. 4	Feb. 6	„ 8	Confluent	D.	Feb. 16	Unvaccinated		—	——	65
99	1501 M. J. B.	F.	33	„ 8	„ 3	„ 6	„ 8	Coherent	Rec.	—	Inf.	3 faint	—	——	66
100	1502 C. J. B.	M.	43	„ 8	„ 6	„ 8	„ 9	Confluent	„	—	Inf.	3 plain	—	——	67
101	1503 S. W.	M.	11	„ 9	„ 7	„ 9	„ 9	Confluent	D.	Feb. 15	Unvaccinated		—	——	56
102	1505 R. P.	F.	5	„ 13	„ 11	„ 13	„ 13	Confluent	D.	„ 22	Unvaccinated		—	——	47
103	1506 W. H. H.	M.	34	„ 13	„ 9	„ 11	„ 13	Confluent	Rec.	—	Inf.	4 plain	—	——	68
104	1508 G. S.	F.	$\frac{3}{12}$	„ 14	„ 11	„ 13	„ 14	Confluent	„	—	Unvaccinated		—	——	61
105	1509 A. W.	F.	6	„ 14	„ 12	„ 14	„ 15	Coherent	„	—	Unvaccinated		—	——	69
106	1510 M. W.	F.	3	„ 14	„ 12	„ 14	„ 15	Coherent	„	—	Unvaccinated		—	——	69
107	1511 A. H,	M.	5	„ 15	„ 12	„ 14	„ 15	Confluent	„	—	Unvaccinated		—	——	70
108	1512 H. P.	M.	$\frac{8}{12}$	„ 15	„ 12	„ 14	„ 16	Discrete	„	—	Unvaccinated		—	——	47
109	1513 A. J. M.	M.	20	„ 15	„ 12	„ 14	„ 16	Confluent	D.	Feb. 23	Unvaccinated		—	Mother prevented successful vaccination immediately after it was attempted in infancy,	71
110	1514 E. W.	F.	20	„ 16	„ 12	„ 14	„ 16	Discrete	Rec.	—	Inf.	4 faint	-	——	72
111	1515 H. H.	M.	24	„ 16	„ 12	„ 14	„ 16	Discrete	—	—	Inf.	3 faint	—	——	73
112	1516 W. H.	M.	3	„ 16	„ 14	„ 16	„ 16	Confluent	D.	Feb. 22	Unvaccinated		—	——	74
113	1517 A. S.	M.	6	„ 16	„ 13	„ 15	„ 17	Confluent	D.	„ 21	Unvaccinated		—	——	75

114	1518	F. P.	M.	10wks.	„ 16	„ 7	„ 9	„ 17	Confluent	D.	19	Unvaccinated		—	——	76
115	1519	R. W.	F.	$1\frac{2}{12}$	„ 16	„ 14	„ 16	—	Discrete	Rec.	—	Unvaccinated		—	——	69
116	1520	F. M.	M.	5	„ 16	„ 14	„ 16	Feb. 17	Confluent	D.	Feb. 26	Unvaccinated		—	——	77
117	1521	W. E.	M.	4	„ 17	„ 14	„ 16	„ 17	Confluent	Rec.	—	Unvaccinated		—	——	78
118	1522	E. K.	F.	28	„ 17	„ 12	„ 14	„ 17	Confluent	„	—	Unvaccinated		—	——	79
119	1523	L. D.	F.	5	„ 17	„ 15	„ 17	„ 17	Confluent	„	—	Unvaccinated		—	——	80
120	1524	A. H.	F.	5	„ 17	„ 15	„ 17	„ 17	Confluent	D.	Mar. 1	Unvaccinated		—	——	81
121	1525	W. H. A.	M.	5	„ 17	„ 14	„ 16	„ 18	Mild	Rec.	—	Unvaccinated		—	——	82
122	1526	A. T.	M.	5	„ 17	„ 14	„ 16	„ 18	Discrete	„	—	Unvaccinated		—	——	83
123	1527	A. O.	M.	6	„ 17	„ 15	„ 17	„ 18	Confluent	„	—	Unvaccinated		—	——	84
124	1528	W. C.	M.	5	„ 17	„ 14	„ 16	„ 18	Confluent	D.	Feb. 23	Unvaccinated		—	——	85
125	1529	G. D. J.	M.	6	„ 18	„ 14	„ 16	„ 19	Discrete	Rec.	—	Unvaccinated		—	——	86
126	1530	H. McC.	F.	19	„ 18	„ 15	„ 17	„ 19	Discrete	„	—	Inf.	4 plain	—	——	59
127	1531	W. P.	M.	32	„ 18	„ 15	„ 17	„ 18	Confluent	„	—	Inf.	4 faint	—	——	47
128	1532	R. T.	M.	7	„ 18	„ 13	„ 15	—	Mild	„	—	Unvaccinated		—	——	87
129	1533	L. T.	M.	5	„ 18	„ 13	„ 15	—	Mild	„	—	Unvaccinated		—	——	87
130	1534	C. M.	M.	6	„ 18	„ 14	„ 18	—	Confluent	„	—	Unvaccinated		—	——	88
131	1535	A. N.	F.	6	„ 19	„ 14	„ 16	„ 20	Coherent	„	—	Unvaccinated		—	——	89
132	1536	C. L.	F.	5	„ 19	„ 17	„ 19	„ 20	Confluent	D.	Feb. 28	Unvaccinated		—	——	90
133	1537	O. N.	M.	3	„ 19	„ 14	„ 16	„ 20	Coherent	Rec.	—	Unvaccinated		—	——	89
134	1538	E. C.	M.	6	„ 19	„ 17	„ 19	„ 20	Confluent	D.	Feb. 24	Unvaccinated		—	——	91
135	1539	F. B.	F.	6	„ 19	„ 16	„ 18	„ 20	Confluent	D.	„ 26	Unvaccinated		—	——	94
136	1540	E. H.	F.	29	„ 19	„ 14	„ 16	„ 27	Discrete	Rec.	—	Inf.	3 plain	—	——	92
137	1541	A. G.	F.	14	„ 19	„ 19	„ 19	„ 19	Mild	„	—	Inf.	3 plain	—	A doubtful case. No premonitory symptoms. Scanty eruption. Varicella ?	93
138	1542	W. W.	M.	5	„ 19	„ 16	„ 18	„ 19	Confluent	„	—	Unvaccinated		—	——	95
139	1543	A. A.	M.	4	„ 19	„ 17	„ 19	„ 19	Confluent	D.	Mar. 20	Unvaccinated		—	——	96
140	1544	M. P.	F.	40	„ 19	„ 17	„ 19	—	Coherent	Rec.	—	Inf.	—	Once	——	54
141	1545	E. B.	F.	25	„ 19	„ 17	„ 19	—	Mild	„	—	Inf.	—	—	——	54
142	1546	E. B.	F.	6	„ 19	„ 8	„ 10	Feb. 20	Confluent	„	—	Unvaccinated		—	——	97
143	1547	C. W.	F.	37	„ 20	„ 17	„ 19	—	Mild	„	—	Inf.	—	—	——	69
144	1548	B. S.	F.	5	„ 20	„ 14	„ 16	Feb. 20	Confluent	„	—	Unvaccinated		—	——	98
145	1549	S. A.	M.	5	„ 20	„ 18	„ 20	„ 20	Discrete	„	—	Unvaccinated		—	——	99
146	1550	W. K.	M.	5	„ 20	„ 15	„ 17	„ 21	Confluent	D.	Feb. 26	Unvaccinated		—	——	100
147	1551	S. H.	M.	8	„ 20	„ 16	„ 18	„ 21	Confluent	D.	„ 29	Unvaccinated		—	——	101
148	1552	C. T.	M.	5	„ 20	„ 16	„ 18	—	Confluent	Rec.	—	Unvaccinated		—	——	102
149	1553	C. T.	F.	69	„ 20	„ 18	„ 20	Feb. 21	Mild	„	—	Inf.	3 faint	—	——	103
150	1554	L. G.	M.	21	„ 20	„ 14	„ 16	—	Malignant	D.	Feb. 21	Aged 7yrs.	—	—	——	104
151	1555	G. B.	F.	5	„ 20	„ 18	„ 20	Feb. 22	Confluent	D.	April 20	Unvaccinated		—	——	105
152	—	E. B.	F.	8	—	Mar. 8	Mar. 10	Mar. 11	Confluent	Rec.	—	Unvaccinated		—	Delirium	105
153	1556	J. H.	M.	3	Feb. 20	Feb. 14	Feb. 16	„ 21	Confluent	D.	Feb. 23	Unvaccinated		—	——	106
154	1557	G. W.	M.	28	„ 21	„ 18	„ 20	—	Mild	Rec.	—	Inf.	—	—	——	107
155	1558	J. J.	M.	5	„ 21	„ 17	„ 19	Mar. 22	Confluent	D.	Mar. 5	Unvaccinated		—	——	108
156	1559	V. E. H.	M.	7	„ 21	„ 16	„ 19	„ 22	Confluent	D.	„ 3	Unvaccinated		—	——	109
157	1560	A. C.	F.	6	„ 21	„ 14	„ 16	„ 22	Confluent	Rec.	—	Unvaccinated		—	——	110
158	1561	E. B.	F.	6	„ 21	„ 14	„ 16	„ 21	Confluent	„	—	Unvaccinated		—	——	111
159	1562	W. R. T.	M.	5	„ 21	„ 17	„ 19	„ 22	Confluent	D.	Feb. 26	Unvaccinated		—	——	113
160	1563	W. A. W.	M.	26	„ 21	„ 19	„ 20	„ 26	Confluent	Rec.	—	Inf.	3 plain	—	——	112
161	1564	M. H.	F.	6	„ 21	„ 19	„ 21	„ 21	Confluent	D.	Mar. 6	Unvaccinated		—	——	114
162	1565	A. G.	F.	5	„ 21	„ 18	„ 20	„ 21	Confluent	D.	Feb. 23	Unvaccinated		—	——	115
163	1566	P. M.	M.	4	„ 21	„ 17	„ 19	„ 22	Confluent	Rec.	—	Unvaccinated		—	——	116
164	1567	D. P.	F.	5	„ 22	„ 16	„ 18	—	Confluent	„	—	Unvaccinated		—	——	117
165	1568	R. P.	M.	5	„ 22	„ 18	„ 20	„ 23	Confluent	„	—	Unvaccinated		—	——	118

No.	Name and Notification Number.	Sex.	Age.	Date of				Type of Attack.	Result.	Date of Death.	Vaccination.		Re-vaccination Date.	Remarks.	No. in House Register.
				Notification.	Onset.	Rash.	Removal to Hospital.				Date.	No. of Marks.			
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
				1896.											
166	1569 W. R.	M.	5	Feb. 22	Feb. 17	Feb. 19	Feb. 23	Confluent	D.	Mar. 2	Unvaccinated		—	—	119
167	1570 W. E. J. A.	M.	5	„ 22	„ 17	„ 19	„ 24	Confluent	Rec.	—	Unvaccinated		—	—	120
168	1571 H. D.	M.	46	„ 22	„ 19	„ 21	„ 23	Confluent	„	—	Inf.	3 plain	—	—	121
169	1572 G. B.	M.	24	„ 22	„ 15	„ 17	„ 23	Mild	„	—	Inf.	2 plain	—	—	122
170	1573 E. B.	M.	30	„ 22	„ 14	„ 16	—	Mild	„	—	Inf.	—	—	—	66
171	1574 H. S.	M.	5	„ 22	„ 18	„ 20	Feb. 24	Discrete	„	—	Unvaccinated		—	—	123
172	1575 E. H.	F.	72	„ 23	—	—	—	Confluent	D.	Feb. 29	Inf.	—	—	—	124
173	1577 F. W.	M.	9	„ 24	Feb. 19	Feb. 21	Feb. 24	Confluent	Rec.	—	Unvaccinated		—	—	26
174	1578 L. K.	F.	5	„ 24	„ 19	„ 21	„ 25	Confluent	D.	Feb. 28	Unvaccinated		—	—	125
175	1579 E. S.	F.	50	„ 24	„ 22	„ 24	„ 26	Discrete	Rec.	—	Inf.	3 plain	—	—	65
176	1580 C. W.	F.	5	„ 24	„ 19	„ 21	„ 27	Confluent	D.	Mar. 1	Unvaccinated		—	—	126
177	1581 W. L.	M.	56	„ 24	„ 19	„ 21	„ 24	Discrete	Rec.	—	Inf.	3 faint	—	—	60
178	1582 W. H.	M.	6	„ 24	„ 20	„ 22	„ 25	Confluent	D.	Mar. 1	Unvaccinated		—	—	127
179	1583 J. T.	M.	37	„ 24	„ 21	„ 23	„ 25	Mild	Rec.	—	Inf.	2 plain	—	—	128
180	1584 W. B.	M.	9	„ 25	„ 22	„ 24	„ 26	Discrete	„	—	Unvaccinated		—	—	58
181	1585 H. S.	M.	3	„ 25	„ 23	„ 25	Mar. 1	Confluent	„	—	Unvaccinated		—	—	129
182	1586 A. H.	F.	3	„ 25	„ 23	„ 25	Feb. 28	Coherent	„	—	Unvaccinated		—	—	130
183	1587 T. R.	M.	6	„ 25	„ 23	„ 25	„ 26	Confluent	„	—	Unvaccinated		—	—	131
184	1588 N. B.	F.	7	„ 25	„ 23	„ 25	„ 26	Confluent	„	—	Unvaccinated		—	—	58
185	1589 O. B.	M.	4	„ 25	„ 19	„ 21	„ 26	Confluent	„	—	Unvaccinated		—	—	132
186	1590 F. B.	F.	3	„ 25	„ 19	„ 21	„ 26	Confluent	D.	Mar. 2	Unvaccinated		—	—	133
187	1591 E. L.	F.	17	„ 25	—	—	—	Discrete	Rec.	—	Inf.	—	—	—	134
188	1592 F. B.	F.	4	„ 26	Feb. 19	Feb. 21	Feb. 26	Confluent	D.	Mar. 1	Unvaccinated		—	—	135
189	1593 T. R.	M.	5	„ 26	„ 20	„ 22	„ 27	Confluent	D.	„ 3	Unvaccinated		—	—	136
190	1594 E. R.	F.	5	„ 26	„ 20	„ 22	—	Confluent	D.	„ 5	Unvaccinated		—	—	137
191	1595 R. W.	M.	4	„ 26	„ 23	„ 25	„ 26	Coherent	Rec.	—	Unvaccinated		—	—	138
192	1596 W. H.	M.	5	„ 26	„ 24	„ 26	„ 27	Confluent	D.	Mar. 10	Unvaccinated		—	—	139
193	1597 R. N.	F.	4	„ 26	„ 18	„ 20	„ 27	Confluent	D.	„ 1	Unvaccinated		—	—	140
194	1598 E. G.	M.	3	„ 27	„ 24	„ 26	„ 27	Confluent	D.	„ 15	Unvaccinated		—	—	142
195	1599 W. S.	M.	3	„ 27	„ 22	„ 25	—	Coherent	Rec.	—	Unvaccinated		—	—	143
196	1600 W. W.	M.	3	„ 27	„ 23	„ 25	Feb. 27	Confluent	„	—	Unvaccinated		—	—	112
197	1601 L. B.	F.	5	„ 26	„ 19	„ 21	„ 26	Confluent	D.	Mar. 2	Unvaccinated		—	—	141
198	1602 W. C.	M.	4	„ 27	„ 21	„ 23	„ 27	Confluent	D.	„ 2	Unvaccinated		—	—	144
199	1603 G. C.	F.	16	„ 27	„ 21	„ 23	„ 27	Mild	Rec.	—	Inf.	2 plain	—	—	145
200	1604 A. C.	M.	5	„ 27	„ 20	„ 22	„ 27	Confluent	„	—	Unvaccinated		—	—	146
201	1605 E. C.	F.	4	„ 27	„ 22	„ 24	„ 27	Confluent	D.	Mar. 6	8 days before admission.		—	—	145
202	1606 M. B.	M.	3	„ 27	„ 23	„ 26	—	Confluent	Rec.	—	Unvaccinated		—	—	147
203	1607 W. W.	M.	15	„ 28	„ 14	„ 16	—	Discrete	„	—	Inf.	—	—	—	148
204	1608 A. C.	F.	5	„ 28	„ 25	„ 27	Feb. 28	Confluent	D.	Mar. 7	Unvaccinated		—	—	149
205	1610 C. C.	F.	6	„ 28	„ 23	„ 25	—	Confluent	Rec.	—	Unvaccinated		—	—	150
206	1611 A. G.	M.	4	„ 28	„ 26	„ 28	Feb. 29	Confluent	D.	Mar. 2	Unvaccinated		—	—	151
207	1612 S. A.	M.	6	„ 28	„ 21	„ 23	„ 28	Confluent	D.	„ 6	Unvaccinated		—	—	152
208	1613 M. S.	F.	3	„ 28	„ 25	„ 27	„ 29	Confluent	Rec.	—	Unvaccinated		—	—	153

209	1614	A. N.	F.	78	„ 28	„ 26	„ 28	—	Discrete	„	—	Inf.	—	—	——	154
210	1615	M. W.	F.	26	„ 28	„ 20	„ 22	Feb. 29	Mild	„	—	Inf.	3 plain, 1 faint.	—	——	112
211	1616	L. S.	F.	5	„ 28	„ 25	„ 27	„ 29	Discrete	„	—	Unvaccinated		—	——	155
212	1617	F. E.	F.	4	„ 28	„ 24	„ 26	„ 29	Confluent	D.	Mar. 5	Unvaccinated		—	——	156
213	1618	F. T.	M.	30	„ 28	„ 26	„ 28	—	Mild	Rec.	—	Inf.	—	—	——	157
214	1619	S. A. P.	F.	40	„ 29	„ 23	„ 25	Feb. 29	Mild	„	—	Inf.	2 plain	—	——	158
215	1620	L. C.	F.	6	„ 29	„ 22	„ 24	Mar. 1	Confluent	D.	Mar. 3	Unvaccinated		—	——	159
216	1621	E. T.	F.	26	„ 29	„ 22	„ 24	Feb. 24	Discrete	Rec.	—	Inf.	3 plain	—	——	83
217	—	E. K. T.	F.	3	—	„ 24	„ 29	„ 29	Discrete	„	—	About 5 days before admission.		—	No pustules	83
218	1622	W. R.	M.	8	Feb. 29	„ 16	„ 21	—	Confluent	„	—	Unvaccinated		—	——	160
219	1623	E. W.	F.	4	„ 29	„ 26	„ 28	Mar. 1	Confluent	D.	Mar. 7	Unvaccinated		—	——	161
220	1624	A. H. M.	M.	3	„ 29	„ 25	„ 27	„ 1	Coherent	Rec.	—	Unvaccinated		—	——	162
221	1625	J. C.	M.	2	„ 29	„ 27	„ 29	„ 1	Confluent	D.	Mar. 6	Unvaccinated		—	——	163
222	—	W. C.	M.	4	—	„ 14	„ 16	Feb. 17	Confluent	D.	Feb. 24	Unvaccinated		—	——	163
223	1626	G. M.	M.	28	Feb. 29	„ 25	„ 27	Mar. 1	Mild	Rec.	—	Inf	2 faint	Attempts; 14 days and 8 days before; no result.	——	164
224	1627	H. E.	M.	1	Mar. 1	„ 27	„ 29	„ 1	Confluent	„	—	Unvaccinated		—	——	78
225	1628	I. H.	F.	4	„ 1	„ 25	„ 27	„ 3	Confluent	D.	Mar. 8	Unvaccinated		—	——	165
226	1629	J. H.	F.	6	„ 1	„ 25	„ 27	„ 3	Confluent	Rec.	—	Unvaccinated		—	——	165
227	1630	C. A. J.	M.	23	„ 1	„ 25	„ 27	„ 1	Confluent	„	—	Inf.	4 faint	—	——	166
228	1631	M. H.	F.	13	„ 1	„ 28	Mar. 1	—	Confluent	„	—	Inf.	—	—	——	167
229	1632	M. S.	F.	4	„ 2	„ 27	„ 29	Mar. 2	Confluent	„	—	Unvaccinated		—	——	168
230	1633	H. A.	F.	6	„ 2	„ 28	„ 1	„ 2	Confluent	„	—	Unvaccinated		—	Severe delirium	96
231	1634	J. P.	M.	37	„ 2	„ 29	„ 2	„ 4	Confluent	„	—	Inf.	3 faint	—	——	76
232	1635	S. A.	M.	2	„ 2	„ 23	Feb. 25	„ 2	Confluent	D.	Mar. 7	Unvaccinated		—	——	82
233	1637	J. G.	M.	11	„ 2	„ 28	Mar. 1	—	Confluent	Rec.	—	Unvaccinated		—	——	169
234	1638	C. B.	F.	4	„ 2	„ 23	Feb. 25	Mar. 3	Confluent	D.	Mar. 8	Unvaccinated		—	——	94
235	1639	V. B.	M.	11	„ 2	—	—	—	Mild	Rec.	—	Inf.	—	—	——	94
236	1640	M. B.	F.	42	„ 2	Feb. 23	Feb. 25	Mar. 3	Confluent	„	—	Inf.	4 faint	—	——	94
237	1641	E. N.	F.	4	„ 2	„ 27	„ 29	„ 3	Confluent	„	—	Unvaccinated		—	——	170
238	1645	F. K.	M.	34	„ 3	„ 26	„ 28	„ 3	Coherent	„	—	Inf.	4 plain	—	——	77
239	1646	G. P.	M.	43	„ 3	„ 29	Mar. 2	„ 4	Confluent	D.	Mar. 16	Inf.	3 faint	—	Delirium	76
240	1647	L. H.	M.	7	„ 3	Mar. 1	„ 3	„ 5	Mild	Rec.	—	Unvaccinated		—	——	171
241	1648	E. S.	F.	42	„ 3	Feb. 28	„ 1	„ 4	Confluent	„	—	Unvaccinated		—	Vaccination failed Feb. 22	98
242	1649	R. J. S.	M.	7	„ 3	„ 28	„ 1	„ 4	Confluent	„	—	Unvaccinated		—	Vaccination failed Feb. 22. Abscesses followed small-pox.	98
243	1650	C. P.	F.	31	„ 4	Mar. 1	„ 3	—	Discrete	„	—	Inf.	No marks	—	——	117
244	1651	E. C.	F.	14	„ 4	„ 1	„ 3	Mar. 5	Mild	„	—	Inf.	3 plain	—	——	172
245	1652	K. A.	F.	6	„ 4	Feb. 29	„ 2	„ 5	Confluent	„	—	Unvaccinated		—	——	99
246	1653	E. B.	F.	56	„ 4	„ 29	„ 2	„ 5	Mild	„	—	Inf.	3 plain	42 years ago	——	99
247	1654	A. N.	F.	29	„ 4	„ 28	„ 1	„ 5	Mild	„	—	Inf.	3 plain	—	——	89
248	1655	P. E. W.	M.	7	„ 4	„ 29	„ 2	„ 5	Confluent	„	—	Unvaccinated		—	——	173
249	1656	S. G.	M.	12	„ 4	Mar. 1	„ 3	„ 5	Confluent	„	—	Unvaccinated		—	——	174
250	1657	E. V.	F.	7	„ 4	„ 1	„ 3	„ 7	Confluent	„	—	Unvaccinated		—	——	175
251	1658	A. W.	M.	14	„ 4	„ 2	„ 4	„ 5	Mild	„	—	Inf.	2 plain	—	——	176
252	1659	M. H.	F.	32	„ 4	„ 2	„ 4	—	Confluent	„	—	Inf.	—	—	——	177
253	1660	L. L.	F.	36	„ 4	„ 1	„ 3	Mar. 5	Confluent	D.	Mar. 21	Inf.	2 plain	—	Acute mania	178
254	1661	A. S.	M.	31	„ 4	Feb. 28	„ 1	„ 5	Discrete	Rec.	—	Inf.	4 plain	—	——	179
255	1662	M. H.	F.	3	„ 5	„ 27	Feb. 29	„ 5	Confluent	D.	Mar. 8	Unvaccinated		—	——	109
256	1663	A. J. H.	M.	7	„ 5	„ 27	„ 29	„ 5	Confluent	Rec.	—	Unvaccinated		—	——	109

No.	Name and Notification Number.		Sex.	Age.	Date of				Type of Attack.	Result.	Date of Death.	Vaccination.		Re-vaccination Date.	Remarks.	No. in House Register.
					Notification.	Onset.	Rash.	Removal to Hospital.				Date.	No. of Marks.			
1.	2.		3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
257	1664	T. S.	M.	10	1896. Mar. 5	Mar. 3	Mar. 5	Mar. 5	Mild	Rec.	—	Inf.	4 plain	—	—	98
258	1665	M. S.	F.	3	„ 5	„ 3	„ 5	„ 5	Confluent	D.	Mar. 30	Unvaccinated.		—	Vaccination failed, Feb. 27	98
259	1666	S. B.	M.	15	„ 5	„ 1	„ 3	„ 5	Mild	Rec.	—	Inf.	4 plain	—	—	94
260	1667	C. B.	M.	13	„ 5	„ 1	„ 3	„ 5	Mild	„	—	Inf.	3 plain	—	—	94
261	1668	R. H.	M.	7	„ 5	Feb. 28	„ 1	„ 7	Confluent	D.	Mar. 10	Unvaccinated		—	—	101
262	1669	A. H.	M.	10	„ 5	„ 28	„ 1	„ 7	Mild	Rec.	—	7 days before admission.		—	—	101
263	1670	E. H.	F.	4	„ 5	„ 28	„ 1	„ 7	Confluent	D.	Mar. 12	7 days before admission.		—	—	101
264	1671	H. P.	M.	24	„ 5	Mar. 3	„ 5	„ 9	Confluent	D.	„ 12	Inf.	4 faint	—	Severe delirium	180
265	1672	A. N. B.	M.	20	„ 5	„ 3	„ 5	„ 6	Mild	Rec.	—	Inf.	4 plain	—	—	94
266	1673	E. B.	M.	17	„ 5	„ 3	„ 5	„ 6	Mild	„	—	Inf.	3 plain	—	—	94
267	1674	C. L.	F.	32	„ 5	„ 2	„ 4	„ 7	Mild	„	—	Inf.	2 plain	—	Pregnant, 7 months	90
268	1675	A. B.	M.	49	„ 5	„ 3	„ 5	„ 6	Mild	„	—	Inf.	2 plain	—	—	94
269	1676	A. R.	M.	4	„ 6	Feb. 26	Feb 28	—	Confluent	„	—	Unvaccinated		—	—	181
270	1677	A. M.	M.	13	„ 6	Mar. 3	Mar. 5	Mar. 6	Mild	„	—	Inf.	4 plain	—	—	182
271	1678	J. P.	F.	18	„ 6	Feb. 29	„ 2	„ 7	Discrete	„	—	Inf.	4 plain	—	—	183
272	1679	E. D.	F.	40	„ 6	—	—	„ 7	Confluent	D.	Mar. 12	Inf.	2 plain	—	Delirium	184
273	1680	A. S.	M.	5	„ 6	Mar. 1	Mar. 3	„ 7	Confluent	D.	„ 14	Unvaccinated		—	—	122
274	1681	A. H.	F.	36	„ 6	„ 2	„ 4	„ 7	Confluent	Rec.	—	Inf.	2 plain	—	Delirium	106
275	1682	A. G.	F.	32	„ 6	„ 2	„ 4	„ 7	Confluent	D.	Mar. 13	Inf.	?	—	Delirium	185
276	1683	F. W.	M.	$\frac{9}{12}$	„ 6	„ 1	„ 3	„ 7	Confluent	D.	„ 12	Unvaccinated		—	—	186
277	1684	W. P.	M.	24	„ 6	Feb. 27	Feb. 29	—	Mild	Rec.	—	Inf.	3 plain	—	—	187
278	1685	E. A.	M.	32	„ 6	Mar. 3	Mar. 5	Mar. 7	Discrete	„	—	Inf.	1 large	—	—	120
279	1686	G. P.	M.	22	„ 6	„ 3	„ 5	—	Mild	„	—	Inf.	—	—	—	188
280	1688	A. L.	M.	$\frac{8}{12}$	„ 6	„ 3	„ 5	Mar. 7	Confluent	D.	Mar. 23	Unvaccinated		—	—	189
281	1689	H. K.	F.	39	„ 6	„ 1	„ 3	„ 7	Confluent	Rec.	—	Inf.	No marks	10 days before admission.	—	190
282	1690	A. W.	M.	17	„ 6	„ 2	„ 4	„ 7	Mild	„	—	Inf.	4 plain	—	—	191
283	1693	P. J.	F.	29	„ 7	„ 2	„ 5	—	Discrete	„	—	Inf.	—	—	—	108
284	1694	W. H.	M.	$\frac{5}{12}$	„ 7	„ 5	„ 7	Mar. 7	Confluent	D.	Mar. 21	Unvaccinated		—	—	106
285	1695	C. M.	F.	13	„ 7	„ 3	„ 5	„ 8	Mild	Rec.	—	Inf.	3 plain, 1 faint.	—	—	192
286	1696	N. W.	F.	13	„ 7	„ 1	„ 3	„ 8	Discrete	„	—	Inf.	4 plain	—	—	119
287	1697	S. A. L.	F.	26	„ 7	„ 5	„ 7	„ 9	Discrete	„	—	Inf.	4 plain	—	Pregnant, 7 months	193
288	1698	A. S.	M.	4	„ 7	„ 5	„ 7	—	Confluent	D.	Mar. 11	Unvaccinated		—	—	194
289	1699	F. M.	M.	12	„ 7	„ 1	„ 3	—	Discrete	Rec.	—	Unvaccinated		—	—	195
290	1700	G. S.	M.	38	„ 7	„ 1	„ 3	Mar. 8	Confluent	„	—	Inf.	2 faint	—	—	196
291	1701	E. T.	F.	31	„ 7	—	—	—	Confluent	D.	Mar. 22	Inf.	—	—	—	113
292	1702	R. C.	F.	27	„ 7	„ 4	Mar. 6	Mar. 9	Confluent	Rec.	—	Unvaccinated		—	—	197
293	1703	W. G.	M.	6	„ 7	„ 5	„ 7	„ 8	Confluent	„	—	Unvaccinated		—	—	198
294	1704	W. H.	M.	39	„ 7	„ 3	„ 5	„ 8	Confluent	„	—	Inf.	2 plain	—	—	199
295	1705	C. H.	F.	25	„ 7	„ 3	„ 5	„ 8	Discrete	„	—	Inf.	3 plain	—	—	200
296	1706	M. P.	F.	17	„ 7	„ 2	„ 3	—	Discrete	„	—	Inf.	—	—	—	201

297	1707	G. W.	M.	35	„ 7	„ 4	„ 6	Mar. 8	Confluent	„	—	Inf.	3 plain	—	Delirium	202
298	1708	F. M.	F.	34	„ 7	„ 5	„ 7	—	Confluent	„	—	Inf.	—	Mar. 3	—	203
299	1709	— H.	F.	43	„ 7	—	—	—	Mild	„	—	Inf.	—	20 years ago	—	204
300	1710	M. A. G.	F.	38	„ 7	Mar. 6	Mar. 8	Mar. 11	Mild	„	—	Inf.	2 plain	—	—	205
301	1711	M. B.	F.	28	„ 8	„ 5	„ 7	„ 8	Mild	„	—	Inf.	4 faint	—	Pregnant, 6 months	133
302	1712	T. M.	M.	30	„ 8	„ 4	„ 6	„ 9	Confluent	„	—	Inf.	4 faint	—	—	206
303	1713	O. C.	M.	13	„ 8	„ 2	„ 4	„ 8	Mild	„	—	Inf.	3 plain	—	—	110
304	1714	L. M.	F.	4	„ 8	„ 6	„ 8	„ 11	Confluent	„	—	Unvaccinated		—	Pneumonia	207
305	1716	E. J.	F.	3	„ 8	„ 2	„ 4	„ 11	Confluent	D.	Mar. 14	Unvaccinated		—	—	208
306	1717	N. C. H.	M.	6	„ 8	„ 3	„ 7	—	Confluent	Rec.	—	Unvaccinated		—	—	209
307	—	E. H.	F.	9	—	„ 17	„ 19	—	Mild	„	—	Inf.	—	—	—	209
308	1718	T. B.	M.	13	„ 8	„ 7	„ 9	Mar. 10	Malignant	D.	Mar. 12	Unvaccinated		—	—	210
309	1719	S. A. T.	F.	42	„ 8	„ 3	„ 5	„ 8	Mild	Rec.	—	Inf.	3 plain	—	—	211
310	1720	G. G.	M.	34	„ 8	—	—	—	Confluent	D.	Mar. 20	Inf.	—	—	Information by neighbour who has charge of surviving children.	151
311	1721	J. P.	M.	50	„ 8	—	—	—	Confluent	D.	„ 11	Inf.	—	—	—	212
312	1722	J. M.	M.	26	„ 8	Mar. 2	Mar. 4	Mar. 8	Mild	Rec.	—	Inf.	3 faint	—	—	213
313	1723	C. P.	M.	30	„ 8	„ 4	„ 6	—	Mild	„	—	Inf.	—	Twice, last occasion 7 years ago.	Very scanty rash.	214
314	1724	W. B.	F.	$\frac{6}{12}$	„ 8	„ 4	„ 6	Mar. 11	Confluent	D.	Mar. 11	Unvaccinated		—	—	94
315	1725	T. D.	M.	26	„ 8	„ 5	„ 7	—	Discrete	Rec.	—	Inf.	—	—	—	215
316	1726	W. H. P.	M.	8	„ 9	„ 3	„ 8	—	Coherent	„	—	Unvaccinated		—	—	216
317	1727	G. G.	M.	34	„ 9	„ 4	„ 7	—	Discrete	„	—	Inf.	—	—	—	104
318	1728	P. B.	M.	4	„ 9	„ 6	„ 7	Mar. 8	Confluent	D.	Mar. 17	Unvaccinated		—	—	132
319	1729	M. E. C.	F.	10	„ 9	„ 8	„ 10	„ 13	Discrete	Rec.	—	Inf.	3 plain	—	—	146
320	1730	A. M.	F.	15	„ 9	„ 6	„ 8	„ 9	Mild	„	—	Inf.	4 plain	—	—	217
321	2427	A. S.	F.	3	Apr. 7	—	—	—	Confluent	„	—	Apr. 6	—	—	—	322
322	1731	H. B.	F.	30	Mar. 9	—	—	—	Mild	„	—	Inf.	—	—	—	58
323	1732	D. R.	F.	$\frac{4}{12}$	„ 9	—	—	—	Confluent	D.	Mar. 14	Unvaccinated		—	Twin sisters	136
324	1733	D. R.	F.	$\frac{4}{12}$	„ 9	—	—	—	Confluent	D.	„ 15	Unvaccinated		—		136
325	1734	A. R.	F.	29	„ 9	—	—	—	Mild	Rec.	—	Inf.	—	—	—	136
326	1735	H. M.	M.	14	„ 9	Feb. 29	Mar. 2	—	Mild	„	—	Inf.	—	Recent 1	—	218
327	1736	L. R.	F.	4	„ 9	—	—	—	Confluent	„	—	Unvaccinated		—	—	136
328	1737	C. M.	M.	1	„ 9	Mar. 8	Mar. 10	Mar. 11	Mild	„	—	Unvaccinated		—	—	207
329	—	E. M.	F.	25	—	—	—	—	Mild	„	—	Inf.	—	—	—	207
330	1738	J. W.	M.	17	Mar. 9	Mar. 6	Mar. 8	—	Mild	„	—	Inf.	—	—	—	56
331	1739	T. W.	M.	21	„ 9	„ 1	„ 3	Mar. 10	Discrete	„	—	Inf.	4 plain	—	—	219
332	1740	E. P.	M.	30	„ 9	Feb. 22	Feb. 24	—	Discrete	„	—	Inf.	—	—	—	220
333	1741	M. M.	F.	29	„ 9	Mar. 7	Mar. 9	—	Confluent	„	—	Inf.	—	—	—	221
334	1742	C. G. S.	M.	12	„ 9	„ 6	„ 8	Mar. 13	Confluent	D.	Mar. 19	Unvaccinated		—	—	222
335	1743	E. G.	F.	1	„ 9	„ 3	„ 5	„ 11	Confluent	D.	„ 12	Unvaccinated		—	—	151
336	1744	A. R.	M.	25	„ 9	„ 2	„ 4	—	Mild	Rec.	—	Inf.	—	—	—	223
337	1745	R. J.	M.	33	„ 9	„ 4	„ 7	—	Mild	„	—	Inf.	—	—	—	224
338	1746	G. M.	M.	29	„ 9	„ 7	„ 8	—	Coherent	„	—	Inf.	—	—	—	225
339	1747	P. G.	F.	32	„ 9	—	—	—	Confluent	D.	Mar. 15	Inf.	—	—	Information by neighbour who has charge of surviving children.	151
340	1748	B. G.	F.	19	„ 9	Mar. 7	Mar. 9	Mar. 12	Discrete	Rec.	—	Inf.	3 faint	—	—	142
341	1749	F. B.	F.	9	„ 9	„ 8	„ 10	„ 13	Discrete	„	—	Unvaccinated		—	—	97
342	1750	K. H.	M.	13	„ 9	—	—	—	Confluent	„	—	Unvaccinated		—	—	226
343	1751	H. A. H.	M.	36	„ 10	Mar. 6	Mar. 8	Mar. 10	Discrete	„	—	Inf.	4 faint	—	—	227
344	1753	M. B.	F.	26	„ 10	„ 8	„ 10	„ 12	Mild	„	—	Int.	2 plain, 1 faint.	—	—	228

No.	Name and Notification Number.		Sex.	Age.	Date of				Type of Attack.	Result.	Date of Death.	Vaccination.		Re-vaccination Date.	Remarks.	No. in House Register.
					Notification.	Onset.	Rash.	Removal to Hospital.				Date.	No. of Marks.			
1.	2.		3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
345	1754	E. N. I.	M.	40	1896. Mar. 10	Mar. 5	Mar. 8	—	Confluent	D.	Mar. 12	Inf.	—	Twice (20 to 30), second time, nil.	Had been in prison service	229
346	1756	F. S.	F.	31	" 10	" 8	" 10	Mar. 14	Mild	Rec.	—	Inf.	3 plain	—	—	129
347	1757	C. B.	F.	24	" 10	" 9	" 11	" 20	Discrete	"	—	Inf.	3 faint	—	—	230
348	1758	G. B.	M.	46	" 10	" 7	" 9	" 11	Discrete	"	—	Inf.	3 plain on each arm.	20 years ago	—	231
349	1759	E. S.	F.	26	" 10	" 8	" 10	" 12	Mild	"	—	Inf.	2 faint	—	—	232
350	1760	N. E.	M.	23	" 10	" 7	" 9	—	Discrete	"	—	Inf.	—	—	—	233
351	1761	K. M.	F.	22	" 10	" 7	" 9	Mar 12	Confluent	"	—	Inf.	3 faint	—	—	99
352	1762	A. T. B.	M.	8	" 10	" 5	" 7	" 14	Confluent	D.	Apr. 15	Unvaccinated		—	"Broncho-pneumonia"	67
353	1763	K. B.	F.	6	" 10	" 7	" 9	" 14	Confluent	D.	Mar. 28	Unvaccinated		—	—	67
354	1764	C. G.	F.	15	" 10	" 7	" 9	" 12	Mild	Rec.	—	Inf.	3 plain	—	—	142
355	1765	F. E. C.	F.	8	" 10	" 8	" 10	" 13	Confluent	"	—	Unvaccinated		—	—	146
356	1766	H. B.	M.	36	" 10	" 1	" 2	—	Discrete	"	—	Inf.	—	—	A doubtful case	234
357	1767	L. D.	M.	1	" 10	" 4	" 6	—	Confluent	D.	Mar. 17	Unvaccinated		—	—	235
358	1768	R. H.	M.	6	" 11	" 10	" 12	Mar. 13	Confluent	Rec.	—	Unvaccinated		—	—	236
359	1769	H. H.	M.	6	" 11	" 8	" 10	—	Confluent	"	—	Unvaccinated		—	—	237
360	1770	J. H. B.	M.	32	" 11	" 6	" 9	—	Discrete	"	—	Inf.	—	—	—	238
361	1771	F. P.	M.	25	" 11	" 7	" 9	—	Coherent	"	—	Inf.	—	—	—	239
362	1772	J. R.	M.	36	" 11	" 8	" 10	Mar. 11	Mild	"	—	Inf.	5 plain	—	—	240
363	1773	E. J. J.	M.	29	" 11	" 7	" 9	" 12	Confluent	D.	Mar. 18	Inf.	3 faint	—	Alcoholism. Hæmorrhage into pustules.	241
364	1774	A. N.	M.	$\frac{9}{12}$	" 11	" 8	" 10	" 12	Mild	Rec.	—	Unvaccinated		—	—	140
365	1775	J. N.	F.	31	" 11	" 6	" 8	" 12	Discrete	"	—	Inf.	3 faint	—	—	140
366	1776	L. T.	F.	8	" 11	" 7	" 9	—	Malignant	D.	Mar. 12	Unvaccinated		—	—	242
367	1777	H. F.	F.	49	" 11	" 6	" 8	Mar. 11	Confluent	Rec.	—	Inf.	1 plain	—	—	243
368	1778	L. S.	F.	$\frac{9}{12}$	" 11	" 8	" 10	—	Confluent	"	—	Unvaccinated		—	—	244
369	1779	E. P.	F.	17	" 11	" 1	" 3	—	Discrete	"	—	Inf.	—	—	—	246
370	1780	E. W.	M.	23	" 11	" 7	" 9	—	Mild	"	—	Inf.	—	—	—	245
371	1781	C. D.	M.	17	" 11	" 6	" 8	—	Mild	"	—	Inf.	—	—	—	247
372	1782	E. B.	F.	41	" 11	" 7	" 10	—	Discrete	"	—	Inf.	—	—	—	248
373	1783	J. B. S.	M.	17	" 11	" 3	" 5	Mar. 11	Mild	"	—	Inf.	1 faint	—	—	249
374	1784	F. H.	F.	27	" 11	" 6	" 8	—	Mild	"	—	Inf.	—	—	—	250
375	1785	W. V.	M.	39	" 11	" 8	" 11	—	Confluent	"	—	Inf.	—	—	—	251
376	1786	V. P.	F.	5	" 11	" 4	" 6	—	Confluent	D.	Mar. 20	Unvaccinated		—	—	252
377	1787	T. N.	M.	36	" 12	" 9	" 13	—	Discrete	Rec.	—	Inf.	—	—	—	253
378	1788	G. S.	M.	37	" 12	" 8	" 11	—	Discrete	"	—	Inf.	—	—	—	143
379	1789	J. T.	M.	38	" 12	" 9	" 11	—	Discrete	"	—	Inf.	—	Since attack nil	Had "small-pox" 23 years ago	254
380	1790	L. S.	M.	8	" 12	" 8	" 10	—	Confluent	"	—	Unvaccinated		—	—	143
381	1791	E. F.	F.	41	" 12	" 9	" 10	—	Confluent	"	—	Inf.	—	Aged 15; no result.	—	255
382	1792	E. S.	F.	6	" 12	" 10	" 12	—	Confluent	"	—	Unvaccinated		—	—	143
383	1793	R. J.	M.	3 wks.	" 12	—	—	—	Confluent	D.	Apr. 3	Unvaccinated		—	Born March 12	256

384	1794	F. N.	M.	12	,, 12	Mar. 6	Mar. 8	Mar. 12	Discrete	Rec.	—	Inf.	3 plain	—	—	150
385	1795	M. M.	F.	35	,, 12	,, 9	,, 11	,, 17	Mild	,,	—	Inf.	2 faint (2) 3 faint (1)	20 years ago	—	257
386	1796	A. S.	M.	21	,, 12	,, 8	,, 10	,, 17	Discrete	,,	—	Inf.	4 plain	—	—	65
387	1797	A. J.	M.	38	,, 12	,, 8	,, 10	Apr. 13	Coherent	,,	—	Inf.	1 plain	—	—	258
388	—	H. G.	M.	18	—	Apr. 25	Apr. 27	—	Mild	,,	—	Inf.	2 scars	—	—	498
389	1799	C. C.	M.	40	Mar. 12	Mar. 11	Mar. 13	Mar. 17	Confluent	,,	—	Inf.	?	—	—	260
390	1800	E. W.	F.	41	,, 13	,, 10	,, 12	—	Mild	,,	—	Inf.	—	—	—	138
391	1801	A. P.	M.	21	,, 13	,, 5	,, 8	—	Mild	,,	—	Inf.	—	—	—	261
392	1802	A. T.	M.	25	,, 13	,, 9	,, 11	—	Coherent	,,	—	Inf.	2 faint	—	—	262
393	1803	S. T.	M.	22	,, 13	,, 10	,, 12	—	Mild	,,	—	Inf.	—	—	—	263
394	1805	F. C.	M.	62	,, 13	,, 8	,, 10	—	Discrete	,,	—	Inf.	—	—	—	264
395	1806	W. B.	M.	17	,, 13	Feb. 21	Feb. 23	—	Mild	,,	—	Unvaccinated		—	—	265
396	1807	H. D.	M.	8	,, 13	Mar. 7	Mar. 12	—	Confluent	,,	—	Unvaccinated		—	—	266
397	1808	J. B.	M.	77	,, 13	,, 7	,, 9	—	Confluent	D.	Mar. 17	Inf.	—	—	Subject to "rheumatism"	267
398	1809	F. J.	F.	33	,, 13	,, 8	,, 10	—	Confluent	Rec.	—	Inf.	—	—	—	256
399	1810	H. R.	M.	17	,, 13	—	—	—	Mild	,,	—	Inf.	—	—	—	268
400	1811	T. R.	M.	35	,, 13	—	—	—	Coherent	,,	—	Inf.	—	—	—	136
401	—	D. R.	M.	1	—	—	—	—	Discrete	,,	—	Unvaccinated		—	—	136
402	1812	D. R.	M.	28	Mar. 13	—	—	—	Discrete	,,	—	Inf.	—	—	—	268
403	1813	W. E.	M.	42	,, 13	—	—	—	Confluent	D.	Mar. 21	Inf.	—	—	—	156
404	1814	W. W.	M.	30	,, 13	Mar. 5	Mar. 7	—	Confluent	Rec.	—	Inf.	—	—	—	269
405	1815	W. B.	M.	3	,, 13	,, 9	,, 11	Mar. 14	Confluent	D.	Mar. 28	Unvaccinated		—	—	67
406	1816	A. J.	F.	25	,, 13	,, 9	,, 11	—	Confluent	Rec.	—	Inf.	—	—	—	270
407	1817	F. B.	F.	5	,, 13	,, 9	,, 11	Mar. 14	Confluent	,,	—	Unvaccinated		—	—	271
408	1818	G. M.	M.	53	,, 13	,, 7	,, 9	—	Confluent	D.	Mar. 16	Inf.	—	—	—	272
409	1819	J. E. P.	M.	45	,, 13	,, 11	,, 12	—	Discrete	Rec.	—	Inf.	—	—	—	273
410	1820	E. L.	M.	23	,, 13	,, 10	,, 12	—	Discrete	,,	—	Inf.	—	—	—	274
411	1821	T. E.	M.	7	,, 13	,, 11	,, 13	—	Confluent	,,	—	Unvaccinated		—	—	275
412	1822	J. W.	M.	16	,, 13	,, 9	,, 13	Mar. 12	Confluent	,,	—	Inf.	—	—	Severe delirium; rash delayed	276
413	1823	F. N.	F.	2	,, 13	,, 9	,, 11	,, 12	Confluent	,,	—	Unvaccinated		—	—	140
414	1824	S. P.	M.	12	,, 13	,, 8	,, 10	,, 14	Confluent	,,	—	Inf.	No marks	—	Said to have been vaccinated	118
415	1825	R. P.	M.	14	,, 13	,, 8	,, 10	,, 14	Confluent	D.	Mar. 21	Unvaccinated		—	—	118
416	1826	E. K.	M.	26	,, 14	—	—	—	Discrete	Rec.	—	Inf.	—	—	—	277
417	1827	T. M.	M.	17	,, 14	Mar. 12	Mar. 14	Mar. 17	Confluent	D.	Mar. 24	Unvaccinated		—	—	278
418	1828	A. L.	F.	67	,, 14	,, 7	,, 10	—	Confluent	Rec.	—	Inf.	—	10 years ago	—	279
419	1829	E. A.	M.	19	,, 14	Feb. 21	Feb. 23	—	Discrete	,,	—	Inf.	—	—	—	280
420	1830	R. S.	F.	27	,, 14	Mar. 9	Mar. 11	—	Discrete	,,	—	Inf.	—	—	—	281
421	1831	E. A.	F.	42	,, 14	,, 10	,, 12	Mar. 14	Confluent	,,	—	Inf.	3 faint	—	—	152
422	1832	A. C.	M.	30	,, 14	,, 8	,, 10	—	Discrete	,,	—	Inf.	—	—	—	149
423	—	M. C.	F.	39	—	,, 22	,, 24	—	Mild	,,	—	Inf.	—	—	—	149
424	1833	E. G.	F.	8	Mar. 14	,, 9	,, 11	Mar. 12	Discrete	,,	—	Unvaccinated		—	—	151
425	1834	F. G.	F.	6	,, 14	,, 9	,, 11	,, 12	Confluent	D.	Mar. 14	Unvaccinated		—	Hæmorrhage into pustules	151
426	1835	E. G.	M.	2	,, 14	,, 9	,, 11	,, 12	Confluent	D.	,, 19	Unvaccinated		—	—	151
427	1836	P. L.	M.	17	,, 14	,, 7	,, 11	—	Mild	Rec.	—	Inf.	—	—	—	282
428	1837	N. M.	F.	5	,, 14	,, 13	,, 15	Mar. 17	Confluent	D.	Mar. 20	Unvaccinated		—	—	213
429	1838	O. B.	M.	8	,, 14	,, 11	,, 13	,, 16	Confluent	D.	,, 24	Unvaccinated		—	Removed from home on illness of others to House 96, on March 9. Slept two nights with E. A. (No. 567).	94
430	1839	A. B.	M.	9	,, 14	,, 8	,, 10	—	Confluent	D.	,, 17	Unvaccinated		—	—	147
431	1840	A. H.	F.	45	,, 14	,, 11	,, 13	Mar. 14	Mild	Rec.	—	Inf.	2 faint	—	—	283
432	1841	A. B.	M.	36	,, 15	,, 12	,, 14	,, 18	Mild	,,	—	Inf.	4 faint	23 years ago	Said to have contracted "cow-pox" in 1882 when milking.	284

No. 1.	Name and Notification Number. 2.	Sex. 3.	Age. 4.	Date of Notification. 5.	Date of Onset. 6.	Date of Rash. 7.	Date of Removal to Hospital. 8.	Type of Attack. 9.	Result. 10.	Date of Death. 11.	Vaccination. Date. 12.	Vaccination. No. of Marks. 13.	Re-vaccination Date. 14.	Remarks. 15.	No. in House Register. 16.
433	1842 A. W. - -	F.	48	1896. Mar. 15	Mar. 11	Mar. 14	—	Confluent -	Rec.	—	Inf.	—	—	—	285
434	1843 A. W. - -	M.	20	,, 15	—	—	—	Mild -	,,	—	Inf.	—	—	—	286
435	1844 E. T. - -	F.	7	,, 15	Mar. 12	Mar. 14	—	Malignant -	D.	Mar. 15	Unvaccinated		—	—	287
436	1845 A. G. - -	F.	23	,, 15	,, 12	,, 15	—	Confluent -	Rec.	—	Inf.	—	—	—	288
437	1846 F. C. - -	F.	29	,, 15	,, 11	,, 13	—	Confluent -	,,	—	Inf.	—	—	—	146
438	1847 M. A. M. - -	F.	12	,, 15	,, 12	,, 14	Mar. 18	Confluent -	,,	—	Unvaccinated		—	—	289
439	1848 G. A. - -	M.	21	,, 15	,, 10	,, 12	,, 17	Discrete -	,,	—	Inf.	4 plain	—	—	152
440	1849 T. S. - -	M.	7	,, 15	,, 12	,, 14	,, 17	Discrete -	,,	—	Unvaccinated		—	—	123
441	1850 T. S. - -	F.	28	,, 15	,, 9	,, 11	—	Coherent -	,,	—	Inf.	—	—	—	290
442	1851 A. T. - -	F.	32	,, 15	,, 10	,, 12	—	Discrete -	,,	—	Inf.	—	—	—	292
443	1852 E. B. - -	F.	25	,, 15	,, 12	,, 14	—	Coherent -	,,	—	Inf.	—	—	—	291
444	1853 T. B. - -	M.	11	,, 15	,, 11	,, 13	—	Mild -	,,	—	Inf.	—	—	—	293
445	1854 E. A. - -	M.	6	,, 15	,, 12	,, 14	Mar. 16	Confluent -	,,	—	Unvaccinated		—	—	294
446	1855 E. S. - -	F.	14	,, 15	,, 13	,, 15	,, 16	Confluent -	D.	Mar. 23	Inf.	4 plain	—	" Chorea " - - -	168
447	1856 S. S. - -	M.	14	,, 15	,, 11	,, 13	—	Discrete -	Rec.	—	Inf.	—	—	—	295
448	1857 S. D. - -	M.	6	,, 15	,, 13	,, 15	Mar. 18	Discrete -	,,	—	Unvaccinated		—	Attempt at vaccination, March 7	184
449	1858 W. G. - - -	M.	42	,, 16	,, 11	,, 15	—	Discrete -	,,	—	Inf.	—	—	—	296
450	1859 P. H. - -	M.	7	,, 16	,, 13	,, 15	Mar. 17	Confluent -	,,	—	Unvaccinated		—	—	297
451	1860 E. S. - - -	M.	3	,, 16	,, 10	,, 12	,, 14	Confluent -	,,	—	Unvaccinated		—	—	129
452	1861 O. S. - -	F.	1	,, 16	,, 10	,, 12	,, 14	Confluent -	D.	Mar. 31	Unvaccinated		—	—	129
453	1862 C. F. - - -	F.	26	,, 16	,, 13	,, 15	,, 18	Confluent -	Rec.	—	Inf.	?	—	Marks obscured by rash -	298
454	1863 E. G. - -	F.	34	,, 16	Feb. 29	,, 2	—	Mild -	,,	—	Inf.	—	Aged 16, 3 places	—	299
455	1864 M. G. - - -	F.	6	,, 16	Mar. 14	,, 16	Mar. 18	Coherent -	,,	—	Unvaccinated		—	—	299
456	1865 F. G. - -	F.	4	,, 16	Feb. 22	Feb. 25	—	Coherent -	,,	—	Unvaccinated		—	—	299
457	— F. L. G. - - -	M.	8	—	Mar. 12	Mar. 14	Mar. 18	Discrete -	,,	—	Unvaccinated		—	—	299
458	1866 R. B. - -	M.	36	Mar. 16	,, 13	,, 15	,, 18	Confluent -	,,	—	Inf.	2 faint, 2 plain.	—	—	300
459	1867 D. C. - - -	M.	6	,, 16	,, 12	,, 14	—	Confluent -	D.	Mar. 22	Unvaccinated		—	—	301
460	1868 N. S. - -	F.	40	,, 16	,, 13	,, 15	—	Coherent -	Rec.	—	Inf.	4 good	—	—	302
461	1869 T. N. - - -	M.	8	,, 16	,, 12	,, 14	—	Confluent -	,,	—	Unvaccinated		—	—	303
462	1870 W. N. - -	M.	36	,, 16	,, 13	,, 15	Mar. 17	Confluent -	D.	Mar. 20	Unvaccinated		—	—	170
463	— G. N. - - -	F.	$\frac{1}{12}$	—	,, 13	,, 15	,, 18	Confluent -	D.	,, 25	Unvaccinated		—	—	170
464	1871 C. N. - -	F.	39	Mar. 16	,, 13	,, 15	,, 18	Coherent -	Rec.	—	Inf.	3 faint	—	—	170
465	1872 J. E. - - -	M.	30	,, 16	,, 14	,, 16	—	Coherent -	,,	—	Inf.	—	—	—	304
466	1873 H. E. T. -	M.	2	,, 16	—	—	—	Confluent -	,,	—	Unvaccinated		—	—	113
467	1874 E. M. - -	F.	1	,, 16	Mar. 14	Mar. 16	—	Confluent -	,,	—	Unvaccinated		—	—	305
468	1875 M. D. - - -	F.	55	,, 17	,, 11	,, 13	Mar. 17	Confluent -	D.	Mar. 21	Inf.	No marks	—	Dementia, past 3 years - -	306
469	1876 T. H. - -	M.	26	,, 17	,, 11	,, 13	,, 21	Mild -	Rec.	—	Inf.	3 plain	—	—	307
470	1877 L. L. - - -	M.	2	,, 17	—	—	—	Confluent -	D.	Mar. 21	Unvaccinated		—	—	308
471	1878 G. J. J. - -	M.	51	,, 17	Mar. 11	Mar. 13	Mar. 18	Discrete -	Rec.	—	Inf.	No marks	—	Carcinoma Recti - -	309
472	1879 F. C. - - -	M.	23	,, 17	,, 8	,, 12	—	Discrete -	,,	—	Inf.	—	Mar. 3 ; 3 places	—	172
473	1880 L. C. - -	F.	14	,, 17	,, 15	,, 17	Mar. 19	Discrete -	,,	—	Inf.	4 plain	Attempted on March 11.	—	310
474	1881 G. B. - - -	M.	16	,, 17	,, 11	,, 13	—	Discrete -	,,	—	Inf.	1 faint	—	—	311

475	1882	E. H.	F.	54	„ 17	„ 10	„ 11	—	Discrete	„	—	Inf.	—	—		312
476	1883	W. H.	M.	6	„ 17	„ 13	„ 15	Mar. 18	Coherent	„	—	Unvaccinated		—		283
477	1884	E. G. B.	M.	5	„ 17	„ 8	„ 10	—	Confluent	D.	Mar. 15	Unvaccinated		—		313
478	1885	I. M. C.	F.	2	„ 17	„ 6	„ 8	—	Confluent	D.	„ 15	Unvaccinated		—		150
479	1886	P. G. T.	M.	7	„ 17	„ 4	„ 6	—	Confluent	Rec.	—	Unvaccinated		—		113
480	1887	T. H.	M.	41	„ 17	—	—	—	Mild	„	—	Inf.	—	—		171
481	1888	E. P.	F.	33	„ 17	Mar. 10	Mar. 16	—	Discrete	„	—	Inf.	—	—		148
482	1889	A. M.	M.	4	„ 17	„ 12	„ 14	—	Discrete	„	—	Unvaccinated		—		314
483	1890	M. P.	F.	40	„ 17	—	—	—	Mild	„	—	Inf.	—	12 years ago		315
484	1891	A. P.	M.	4	„ 17	Mar. 4	Mar. 6	—	Confluent	D.	Mar. 25	Unvaccinated		—		316
485	1892	E. D.	F.	28	„ 17	„ 12	„ 15	—	Discrete	Rec.	—	Inf.	—	—		317
486	1893	E. G.	F.	5	„ 17	„ 14	„ 16	Mar. 19	Confluent	„	—	Unvaccinated		—		318
487	1894	G. C.	F.	9	„ 17	„ 12	„ 14	—	Confluent	„	—	Unvaccinated		—		319
488	1895	G. F. L.	M.	25	„ 17	„ 15	„ 17	—	Mild	„	—	Inf.	—	—		320
489	1896	A. J.	F.	6	„ 17	„ 13	„ 15	Mar. 19	Confluent	„	—	Unvaccinated		—		321
490	1897	W. S.	M.	41	„ 17	„ 14	„ 16	„ 19	Mild	„	—	Inf.	2 plain, 1 faint	—		322
491	1898	M. R.	F.	2	„ 17	—	—	—	Confluent	D.	Mar. 23	Unvaccinated		—		323
492	1899	A. M.	M.	6	„ 17	Mar. 12	Mar. 16	—	Confluent	Rec.	—	Unvaccinated		—		64
493	—	T. M.	M.	4	—	„ 29	April 2	—	Confluent	„	—	Unvaccinated		—		64
494	—	A. M.	F.	33	—	„ 8	Mar. 10	—	Mild	„	—	Inf.	—	—		64
495	1900	L. B.	M.	7	Mar. 17	„ 12	„ 14	—	Confluent	„	—	Unvaccinated		—		324
496	1901	C. B.	F.	25	„ 17	„ 14	„ 16	—	Mild	„	—	Inf.	—	—		325
497	—	A. B.	M.	26	—	Apr. 2	April 6	—	Confluent	„	—	Inf.	—	—		325
498	1902	V. C.	F.	8	Mar. 17	Mar. 12	Mar. 15	—	Confluent	„	—	Unvaccinated		—		159
499	—	A. C.	F.	29	—	„ 14	„ 15	—	Mild	„	—	Inf.	—	—	Very mild; thought to be "German measles."	159
500	1903	I. H.	F.	28	Mar. 18	„ 14	„ 16	Mar. 18	Discrete	„	—	Inf.	4 plain	—		326
501	—	E. M.	F.	9	—	April 2	April 3	—	Mild	„	—	Inf.	—	—		64
502	1904	E. C.	F.	3	Mar. 18	Mar. 14	Mar. 16	—	Malignant	D.	Mar. 18	Unvaccinated		—		327
503	1905	J. S.	M.	25	„ 18	—	—	—	Discrete	Rec.	—	Inf.	—	—		328
504	1906	C. S.	M.	22	„ 18	Mar. 16	Mar. 17	—	Mild	„	—	Inf.	—	—		329
505	1907	R. D.	M.	18	„ 18	„ 14	„ 16	—	Confluent	D.	Mar. 26	Unvaccinated		—		330
506	1908	W. T.	M.	4	„ 18	„ 13	„ 15	Mar. 19	Confluent	D.	„ 26	Unvaccinated		—	Unsuccessful attempt at vaccination on March 10.	331
507	1909	A. P.	M.	12	„ 18	„ 15	„ 17	—	Confluent	Rec.	—	Unvaccinated		—		332
508	1910	W. H. A.	M.	7	„ 18	„ 14	„ 17	—	Coherent	„	—	Mar. 14	—	—		333
509	3312	H. H.	M.	28	May 28	May 26	May 28	May 29	Malignant	D.	June 1	Unvaccinated		—	Infantile vaccination said to have been unsuccessful.	633
510	3292	J. M.	M.	25	„ 24	„ 21	„ 23	„ 24	Mild	Rec.	—	Inf.	4 scars, plain.	—		958
511	1913	L. L.	F.	6	Mar. 19	Mar. 16	Mar. 18	Mar. 20	Confluent	D.	Mar. 29	Unvaccinated		—		189
512	1914	C. L.	F.	28	„ 19	„ 16	„ 18	„ 20	Confluent	D.	May 2	Inf.	No marks	—	Died of syncope, when convalescent.	189
513	1915	A. L.	F.	9	„ 19	„ 16	„ 18	„ 20	Mild	Rec.	—	Inf.	—	—		189
514	1916	L. C.	F.	3	„ 19	„ 15	„ 17	—	Confluent	„	—	Unvaccinated		—		150
515	1917	A. L.	M.	8	„ 19	„ 16	„ 18	Mar. 20	Confluent	D.	Mar. 20	Unvaccinated		—		189
516	1913	M. E. B.	F.	9	„ 19	„ 13	„ 15	—	Confluent	D.	„ 27	Unvaccinated		—		335
517	1919	E. D.	M.	24	„ 19	„ 13	„ 15	Mar. 18	Confluent	Rec.	—	Inf.	3 faint	—		336
518	1920	K. K.	F.	6	„ 19	„ 12	„ 14	—	Confluent	D.	Mar. 26	Unvaccinated		—		337
519	2619	G. W.	M.	25	April 13	April 7	April 9	April 12	Confluent	Rec.	—	Inf.	4 good	—		669
520	1922	W. A. T.	M.	26	Mar. 19	Mar. 15	Mar. 17	—	Discrete	„	—	Inf.	4 plain	—		338
521	1923	E. S.	F.	31	„ 19	„ 16	„ 18	—	Coherent	„	—	Inf.	—	—		339
522	1924	I. Q.	F.	19	„ 19	„ 15	„ 17	Mar. 24	Mild	„	—	Inf.	—	—	? Small-pox in 1887	340
523	1925	J. C.	M.	22	„ 19	„ 13	„ 14	—	Discrete	„	—	Inf.	—	—		341

No.	Name and Notification Number.		Sex.	Age.	Date of				Type of Attack.	Result.	Date of Death.	Vaccination.		Re-vaccination Date.	Remarks.	No. in House Register.
					Notification.	Onset.	Rash.	Removal to Hospital.				Date.	No. of Marks.			
1.	2.		3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
524	1926	C. S.	M.	5	1896. Mar. 19	—	—	—	Confluent	D.	April 14	Unvaccinated		—	—	244
525	1927	W. S.	M.	4	,, 19	—	—	—	Confluent	D.	May 9	Unvaccinated		—	—	244
526	1928	J. S.	M.	1	,, 19	Mar. 16	Mar. 18	—	Confluent	D.	April 2	Unvaccinated		—	—	244
527	1929	E. S.	F.	3	,, 19	,, 16	,, 18	—	Confluent	D.	,, 4	Unvaccinated		—	—	244
528	1930	H. H.	M.	1	,, 19	,, 13	,, 15	Mar. 22	Confluent	D.	Mar. 24	Unvaccinated		—	—	165
529	1931	E. P.	F.	8	,, 19	,, 13	,, 16	—	Confluent	Rec.	—	Unvaccinated		—	—	342
530	1932	C. S.	F.	33	,, 19	—	—	—	Mild	,,	—	Inf.	—	—	—	244
531	1933	H. A. P.	M.	30	,, 19	Mar. 16	Mar. 19	—	Discrete	,,	—	Inf.	—	Attempted during attack.	—	343
532	1934	J. S.	M.	32	,, 20	,, 14	,, 17	—	Mild	,,	—	Inf.	—	—	—	344
533	1935	G. M.	M.	4	,, 20	,, 15	,, 17	Mar. 20	Confluent	D.	Mar. 27	Unvaccinated		—	—	345
534	1936	E. A. M.	F.	11	,, 20	,, 16	,, 18	,, 19	Confluent	Rec.	—	Unvaccinated		—	—	195
535	—	G. H. T.	M.	24	—	,, 10	,, 12	—	Mild	,,	—	Inf.	—	March 10. Nil.	—	263
536	—	C. M.	M.	44	—	—	—	—	Discrete	,,	—	Inf.	—	—	—	444
537	1939	A. S.	M.	5	Mar. 20	Mar. 17	Mar. 19	Mar. 20	Confluent	D.	Mar. 26	Unvaccinated		—	—	194
538	1940	B. R. S.	F.	7	,, 20	,, 17	,, 19	,, 20	Confluent	D.	,, 29	Unvaccinated		—	—	194
539	1941	P. S.	F.	9	,, 20	,, 17	,, 19	,, 20	Confluent	D.	,, 28	Unvaccinated		—	—	194
540	1942	A. S.	F.	14	,, 20	,, 15	,, 17	,, 20	Mild	Rec.	—	Inf.	4 plain	—	—	194
541	1943	C. S.	M.	10	,, 20	,, 16	,, 18	,, 20	Discrete	,,	—	Inf.	3 plain	—	—	194
542	1944	A. S.	F.	34	,, 20	,, 15	,, 17	,, 20	Mild	,,	—	Inf.	3 faint	—	Pregnant; syphilitic	194
543	1946	K. E.	F.	5	,, 20	,, 15	,, 17	—	Confluent	,,	—	Unvaccinated		—	—	275
544	1947	A. S.	F.	16	,, 20	,, 17	,, 19	Mar. 19	Malignant	D.	Mar. 24	Inf. ?	No marks	—	Congenital syphilis; scar in liver	347
545	1948	W. R.	M.	53	,, 20	,, 19	,, 20	—	Discrete	Rec.	—	Inf.	—	—	—	349
546	1949	A. K.	M.	24	,, 20	,, 18	,, 20	—	Mild	,,	—	Inf.	—	—	—	348
547	1950	J. H.	M.	29	,, 20	,, 18	,, 20	—	Confluent	,,	—	Inf.	—	—	—	177
548	1951	E. F.	M.	24	,, 20	,, 18	,, 19	—	Mild	,,	—	Inf.	—	—	Doubtful case	350
549	1952	E. M'M.	F.	26	,, 20	,, 20	,, 22	Mar. 24	Mild	,,	—	Inf.	1 plain, 1 faint.	—	Pregnant, 7½ months	351
550	—	E. M'M.	F.	38 hrs.	—	—	—	Apr. 7	Indeterminate	D.	Apr. 7	Unvaccinated		—	Born in hospital 7th April, premature (8 months).	351
551	1953	E. J.	F.	46	Mar. 20	Mar. 17	Mar. 19	—	Mild	Rec.	—	Inf.	—	—	—	352
552	1954	W. G. L.	M.	20	,, 20	,, 18	,, 20	Mar. 22	Coherent	,,	—	Inf.	4 plain	—	—	353
553	1955	W. R.	M.	8	,, 20	,, 13	,, 15	—	Confluent	,,	—	Mar. 12	—	—	—	181
554	1956	A. K.	F.	30	,, 20	,, 19	,, 21	Mar. 24	Discrete	,,	—	Inf.	3 plain	—	—	354
555	1957	E. S.	M.	8	,, 20	,, 18	,, 20	—	Confluent	D.	Mar. 23	Unvaccinated		—	No. 946 (fatal), stepbrother	122
556	—	S. S.	M.	10	—	,, 1	,, 3	—	Mild	Rec.	—	Inf.	—	—	—	122
557	—	T. S.	M.	14	—	,, 8	,, 10	—	Mild	,,	—	Inf.	—	—	—	122
558	1958	F. G.	M	34	Mar. 20	,, 15	,, 17	—	Mild	,,	—	Inf.	—	—	—	355
559	1959	N. P.	F.	3	,, 20	,, 18	,, 20	—	Confluent	D.	Mar. 27	Unvaccinated		—	—	356
560	1960	E. T.	F.	32	,, 20	,, 18	,, 19	—	Discrete	Rec.	—	Inf.	—	11 or 12 years ago.	—	357
561	1961	G. P.	M.	5	,, 20	,, 11	,, 13	—	Confluent	,,	—	Unvaccinated		—	—	356
562	1962	W. C.	M.	8	,, 20	,, 14	,, 16	Mar. 23	Confluent	,,	—	Unvaccinated		—	—	358
563	1963	A. P.	M.	8	,, 20	,, 11	,, 13	—	Confluent	,,	—	Unvaccinated		—	—	356

564	1964	L. H.	F.	5	„ 20	„ 17	„ 19	—	Confluent	„	—	Unvaccinated		—	——	359
565	1965	E. L.	M.	15	„ 20	„ 13	„ 15	Mar. 22	Mild	„	—	Inf.	3 plain	—	——	360
566	1966	E. H.	F.	23	„ 21	„ 16	„ 19	—	Discrete	„	—	Inf.	—	—	——	361
567	1967	E. A.	M.	14	„ 21	„ 16	„ 18	—	Discrete	„	—	Inf.	—	—	——	96
568	1968	L. M.	F.	18	„ 21	—	—	—	Confluent	D.	Mar. 26	Unvaccinated		—	——	362
569	1969	E. F.	F.	20	„ 21	Mar. 17	Mar. 19	—	Discrete	Rec.	—	Inf.	—	—	——	363
570	1970	D. M.	M.	9	„ 19	„ 14	„ 16	Mar. 18	Discrete	„	—	Unvaccinated		—	——	182
571	1971	C. M.	F.	15	„ 19	„ 15	„ 17	„ 18	Confluent	„	—	Inf.	4 plain	—	——	182
572	1972	E. D.	F.	38	„ 21	„ 19	„ 21	—	Confluent	„	—	Inf.	—	—	——	364
573	1974	A. S.	M.	55	„ 21	„ 19	„ 21	—	Discrete	„	—	Inf.	—	—	——	365
574	1976	H. M.	M.	5	„ 21	„ 19	„ 21	Mar. 22	Malignant	D.	Mar. 23	Unvaccinated		—	——	366
575	1977	F. M.	F.	8	„ 21	„ 17	„ 19	—	Coherent	Rec.	—	Unvaccinated		—	——	116
576	1978	L. M.	M.	14	„ 21	—	—	—	Mild	„	—	Inf.	—	—	——	116
577	1979	Mrs. G.	F.	34	„ 21	—	—	—	Mild	„	—	Inf.	—	—	——	368
578	1980	B. J.	F.	9	„ 21	Mar. 14	Mar. 16	—	Mild	„	—	Inf.	—	—	——	369
579	1981	A. M.	M.	11	„ 21	„ 19	„ 21	—	Mild	„	—	Inf.	—	1 recent	——	218
580	—	J. M.	F.	10	—	—	Feb. 22	—	Mild	„	—	Inf.	—	—	——	218
581	1982	M. L.	F.	24	Mar. 21	Mar. 18	Mar. 20	—	Mild	„	—	Inf.	—	—	——	370
582	1983	M. S.	F.	27	„ 21	„ 19	„ 21	Mar. 24	Confluent	„	—	Inf.	4 plain, 1 faint.	14 years ago	——	117
583	—	L. P.	F.	7	—	„ 4	„ 6	—	Confluent	„	—	Unvaccinated		—		117
584	1984	W. R.	M.	27	Mar. 21	„ 19	„ 21	—	Discrete	„	—	Inf.	—	—	——	119
585	1985	G. S.	M.	12	„ 21	—	—	—	Mild	„	—	Inf.	—	Yes	——	194
586	1986	— M.	F.	42	„ 21	Mar. 17	Mar. 19	—	Discrete	„	—	Inf.	—	—	——	272
587	1987	E. M.	F.	15	„ 21	—	—	—	Confluent	„	—	Inf.	No marks	—	——	272
588	1990	T. H. P.	M.	14	„ 21	Mar. 20	Mar. 22	—	Mild	„	—	Inf.	—	—	——	356
589	1992	C. D.	F.	10	„ 21	„ 18	„ 20	—	Coherent	„	—	Mar. 9	—	—	——	372
590	1993	E. M.	F.	17	„ 21	„ 17	„ 19	—	Confluent	D.	Apr. 2	Unvaccinated		—	Three attempts at vaccination in infancy, all failed.	272
591	1994	M. H.	F.	38	„ 21	—	—	—	Confluent	D.	Mar. 20	Inf.	—	—	Information from neighbours	131
592	1996	E. D.	F.	2	„ 22	—	—	—	Confluent	D.	„ 26	Unvaccinated		—	——	374
593	1995	M. C.	F.	23	„ 22	Mar. 15	Mar. 17	—	Confluent	Rec.	—	Inf.	3 good	—	——	373
594	1997	A. F.	M.	40	„ 22	„ 18	„ 20	Mar. 23	Confluent	„	—	Inf.	3 faint	—	——	375
595	1998	F. A.	F.	16	„ 22	„ 19	„ 21	—	Mild	„	—	Inf.	—	—	——	376
596	1999	C. A.	M.	7	„ 22	„ 19	„ 21	—	Confluent	„	—	Unvaccinated		—	——	376
597	2000	M. L.	F.	23	„ 22	—	—	—	Mild	„	—	Inf.	—	—	——	377
598	2001	C. S.	F.	29	„ 22	Mar. 17	Mar. 20	—	Coherent	„	—	Inf.	No marks	—	——	378
599	2002	H. W.	F.	42	„ 22	—	—	—	Malignant	D.	Mar. 22	Inf.	—	—	Information by neighbours	379
600	2003	A. P.	M.	21	„ 22	—	—	—	Discrete	Rec.	—	Inf.	—	—	——	246
601	2004	M. T.	F.	8	„ 22	—	Mar. 20	—	Confluent	„	—	Unvaccinated		—	Attempted vaccination, March 18, not successful.	380
602	2005	C. B.	M.	49	„ 23	Mar. 19	„ 22	—	Mild	„	—	Inf.	4 plain	—	——	381
603	2006	S. A.	M.	9	„ 23	„ 18	„ 20	Mar. 23	Mild	„	—	Inf.	—	—	——	240
604	2007	F. M. S.	F.	2	„ 23	„ 20	„ 21	—	Confluent	D.	Mar. 31	Unvaccinated		—	——	382
605	2008	M. P.	F.	30	„ 23	„ 21	„ 23	—	Mild	Rec.	—	Inf.	—	—	——	252
606	2009	M. B.	F.	4	„ 23	„ 20	„ 22	Mar. 24	Confluent	D.	Apr. 12	Vaccinated 2 days before admission.		—	Meningitis ?	383
607	2010	H. S.	M.	$\frac{11}{12}$	„ 23	„ 21	„ 23	„ 24	Coherent	D.	„ 13	Unvaccinated		—	Rash some days before full development. Died from bronchopneumonia, April 13.	232
608	2011	A. P.	M.	37	„ 23	„ 20	„ 22	„ 24	Discrete (severe).	Rec.	—	Inf.	1 plain, 1 faint.	—	——	384
609	2012	T. M.	M.	14	„ 23	„ 19	„ 21	—	Discrete	„	—	Inf.	—	March 19	——	272
610	2913	A. M.	M.	6 wks.	„ 23	—	—	—	Confluent	D.	Mar. 27	Unvaccinated		—	——	272
611	2014	H. L.	M.	17	„ 23	Mar. 19	Mar. 21	—	Discrete	Rec.	—	Inf.	—	—	——	385

No.	Name and Notification Number.	Sex.	Age.	Date of				Type of Attack.	Result.	Date of Death.	Vaccination.		Re-vaccination Date.	Remarks.	No. in House Register.
				Notification.	Onset.	Rash.	Removal to Hospital.				Date.	No. of Marks.			
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
612	2015 W. H.	M.	70	1896. Mar. 23	Mar. 20	Mar. 22	—	Confluent	Rec.	—	Inf.	—	—	—	386
613	— Mrs. H.	F.	69	—	—	—	—	Discrete	,,	—	Childhood	—	—	—	386
614	2016 E. W.	F.	41	Mar. 23	Mar. 16	Mar. 18	—	Discrete	,,	—	Inf.	—	—	—	387
615	2017 A. S.	M.	20	,, 23	,, 19	,, 23	—	Mild	,,	—	Inf.	—	—	—	388
616	2018 G. W.	F.	12	,, 23	,, 22	,, 23	—	Mild	,,	—	Inf.	1 large	—	—	389
617	2019 — S.	F.	24	,, 23	,, 16	,, 18	—	Mild	,,	—	Inf.	—	—	—	390
618	2020 E. W.	F.	2	,, 23	,, 21	,, 23	—	Mild	,,	—	Unvaccinated		—	—	389
619	2021 J. D.	F.	24	,, 23	,, 20	,, 23	—	Discrete	,,	—	Inf.	—	—	—	215
620	2022 F. M.	M.	30	,, 23	,, 17	,, 19	Mar. 24	Confluent	,,	—	Inf.	3 faint	—	—	208
621	2023 C. P.	F.	35	,, 23	,, 14	,, 15	—	Malignant	D.	Mar. 21	Inf.	—	—	—	356
622	2024 E. C.	F.	26	,, 24	,, 15	,, 17	—	Confluent	D.	,, 30	Inf.	—	—	Confined March 11	391
623	— C. (Infant)	M.	12 hrs.	—	—	—	—	Indeterminate	D.	,, 12	Unvaccinated		—	Covered with eruptions	391
624	2025 A. M.	F.	5	Mar. 24	Mar. 23	Mar. 24	—	Coherent	Rec.	—	Mar. 19	—	—	—	195
625	2026 E. H.	F.	4	,, 24	,, 18	,, 20	—	Confluent	,,	—	Unvaccinated		—	—	392
626	2027 J. M.	M.	38	,, 24	,, 18	,, 20	—	Confluent	,,	—	Inf.	—	Attempt 7 years ago. No result.	—	393
627	2028 C. T.	M.	38	,, 24	,, 17	,, 19	—	Discrete	,,	—	Inf.	—	—	—	394
628	2029 G. P.	M.	18	,, 24	,, 18	,, 20	Mar. 24	Confluent	,,	—	Inf.	4 plain	—	—	246
629	2030 W. G.	M.	66	,, 24	,, 17	,, 19	—	Mild	,,	—	Inf.	—	2 years ago. No result.	—	246
630	2031 W. M.	F.	2	,, 24	,, 19	,, 21	—	Confluent	D.	Mar. 30	Unvaccinated		—	—	395
631	2032 N. P.	F.	24	,, 24	,, 17	,, 19	—	Discrete	Rec.	—	Inf.	—	—	—	246
632	2033 W. M.	M.	12	,, 24	,, 19	,, 21	—	Mild	,,	—	Inf.	—	Mar. 19	—	272
633	2034 G. W.	M.	28	,, 24	,, 16	,, 21	—	Discrete	,,	—	Inf.	—	—	—	186
634	2035 M. P.	F.	30	,, 24	,, 22	,, 24	—	Mild	,,	—	Inf.	—	—	A doubtful case	187
635	2036 A. M.	F.	2	,, 24	,, 21	,, 23	—	Mild	,,	—	Mar. 19	—	—	—	272
636	2037 F. M.	M.	3	,, 24	,, 19	,, 21	—	Mild	,,	—	Mar. 19	—	—	—	272
637	2039 E. D.	F.	30	,, 24	,, 21	,, 23	—	Coherent	,,	—	Inf.	—	—	—	235
638	2040 A. D.	M.	29	,, 24	,, 21	,, 23	—	Discrete	,,	—	Inf.	—	—	—	235
639	2041 F. L.	M.	10	,, 24	—	—	—	Mild	,,	—	Inf.	—	—	—	396
640	2042 T. P.	M.	5	,, 24	Mar. 18	Mar. 20	—	Coherent	,,	—	Unvaccinated		—	—	397
641	2043 A. P.	F.	15	,, 24	,, 17	,, 19	—	Mild	,,	—	Inf.	—	—	—	397
642	2044 E. P.	M.	8	,, 24	,, 21	,, 23	—	Malignant	D.	Mar. 27	Unvaccinated		—	—	316
643	2045 — T.	M.	10wks.	,, 24	—	—	—	Confluent	D.	,, 30	Unvaccinated		—	—	113
644	2188 A. T.	F.	41	,, 30	—	—	—	Confluent	Rec.	—	Inf.	—	—	—	113
645	2046 B. D.	F.	28	,, 25	Mar. 21	Mar. 23	Mar. 27	Confluent	,,	—	Inf.	—	—	—	398
646	2047 C. D.	M.	49	,, 25	,, 19	,, 21	—	Malignant	D.	Mar. 25	Inf.	—	—	—	399
647	2048 D. J.	F.	$1\frac{8}{12}$	,, 25	,, 20	,, 22	—	Discrete	Rec.	—	Unvaccinated		—	—	87
648	2049 C. P.	F.	4	,, 25	,, 17	,, 22	—	Mild	,,	—	Unvaccinated		—	—	216
649	2050 F. P.	M.	36	,, 25	,, 22	,, 24	—	Mild	,,	—	Inf.	—	Twice, nil	—	316
650	2052 M. A. P.	F.	35	,, 25	,, 19	,, 21	—	Mild	,,	—	Inf.	—	Mar. 24	—	316
651	2053 S. G.	F.	20	,, 25	,, 21	,, 23	—	Mild	,,	—	Inf.	—	—	—	400

652	2057	G. A.	M.	56	„ 25	„ 21	„ 23	Mar. 30	Coherent	„	—	Inf.	2 faint	—	—	280
653	2055	T. V.	M.	19	„ 25	„ 23	„ 25	—	Discrete	„	—	Inf.	—	—	—	401
654	2056	E. P.	F.	6	„ 25	„ 15	—	—	Confluent	D.	Mar. 25	Unvaccinated		—	—	304
655	2058	F. M.	M.	9	„ 25	„ 22	Mar. 24	—	Confluent	D.	Apr. 3	Unvaccinated		—	—	395
656	2059	A. B.	F.	10	„ 25	„ 23	„ 25	Mar. 27	Coherent	Rec.	—	Unvaccinated		—	—	67
657	2061	B. M.	F.	4	„ 25	„ 20	„ 22	—	Coherent	„	—	Unvaccinated		—	—	395
658	2060	A. W.	F.	35	„ 25	„ 13	„ 15	—	Mild	„	—	Inf.	—	—	—	402
659	2062	F. M.	F.	8	„ 25	„ 20	„ 22	—	Discrete	„	—	Unvaccinated		—	—	395
660	—	A. M.	F.	28	„ 15	—	—	—	Mild	„	—	Inf.	—	—	—	395
661	2063	R. A.	F.	30	Mar. 25	Mar. 23	Mar. 25	Mar. 30	Confluent	„	—	Inf.	3 faint	—	—	280
662	2067	T. T.	M.	29	„ 26	„ 27	„ 30	—	Coherent	„	—	Inf.	—	—	—	242
663	2064	F. B.	F.	10	„ 25	„ 23	„ 25	Mar. 26	Confluent	D.	Apr. 1	Unvaccinated		—	—	403
664	—	E. B.	F.	2	—	„ 23	„ 25	„ 26	Confluent	D.	„ 2	Unvaccinated		—	—	403
665	2065	R. M.	M.	4	„ 26	„ 24	„ 26	—	Confluent	D.	„ 6	Mar. 19	—	—	—	195
666	2066	E. M.	F.	7	„ 26	„ 18	„ 20	Mar. 22	Confluent	Rec.	—	Unvaccinated		—	—	195
667	2072	E. W.	F.	31	„ 26	„ 19	„ 21	—	Discrete	„	—	Inf.	—	Mar. 15 (2)	—	269
668	2069	E. W.	F.	8	„ 26	„ 24	„ 26	Apr. 9	Coherent	„	—	Unvaccinated		—	—	405
669	2070	E. S.	F.	1	„ 26	—	—	—	Confluent	D.	Apr. 1	Unvaccinated		—	—	194
670	2079	E. N.	F.	$\frac{5}{12}$	„ 26	Mar. 19	Mar. 21	—	Confluent	Rec.	—	Unvaccinated		—	—	253
671	2080	E. W.	M.	11	„ 26	„ 24	„ 26	—	Mild	„	—	Inf.	—	—	—	276
672	2081	J. S.	M.	32	„ 26	„ 24	„ 26	—	Mild	„	—	Inf.	—	—	—	129
673	2083	E. C.	M.	2	„ 26	„ 21	„ 23	—	Confluent	„	—	2 days before.	—	—	—	146
674	2084	A. S.	M.	27	„ 26	„ 23	„ 25	—	Discrete	„	—	Inf.	—	—	—	281
675	2082	E. P.	F.	62	„ 26	„ 21	„ 24	—	Discrete	„	—	Inf.	—	—	—	406
676	2088	H. B.	M.	3 wks.	„ 26	—	—	—	Confluent	D.	Apr. 21	Unvaccinated		—	—	313
677	2089	R. H.	F.	11	„ 26	Mar. 22	Mar. 24	—	Discrete	Rec.	—	Inf.	—	Mar. 16	—	371
678	2086	W. V.	M.	12	„ 26	„ 24	„ 26	—	Mild	„	—	Inf.	2 good	—	—	401
679	2087	F. A.	F.	22	„ 26	—	—	—	Malignant	D.	Mar. 26	Inf.	—	—	Post partum	407
680	—	A. B.	M.	20	—	Apr. 4	Apr. 6	—	Discrete	Rec.	—	Inf.	4 plain	—	—	898
681	2091	F. A.	F.	6	Mar. 26	Mar. 24	Mar 26	—	Malignant	D.	Apr. 4	Unvaccinated		—	"Measly rash"	408
682	—	A. C.	M.	13	—	—	—	—	Mild	Rec.	—	Inf.	—	—	A doubtful case	412
683	2093	B. A.	F.	7	Mar. 26	Mar. 23	Mar. 25	—	Coherent	„	—	Unvaccinated		—	Very large pustules	409
684	2094	C. P.	F.	7	„ 26	„ 23	„ 26	—	Confluent	D.	Apr. 4	Unvaccinated		—	—	410
685	2095	E. R.	F.	3	„ 26	„ 24	„ 26	—	Confluent	Rec.	—	Unvaccinated		—	—	411
686	2096	A. B.	F.	33	„ 26	„ 24	„ 26	Mar. 27	Discrete	„	—	Inf.	4 faint	—	Pregnant, 8 months	271
687	2097	J. H.	M.	34	„ 26	„ 21	„ 23	—	Coherent	„	—	Inf.	—	—	—	272
688	2098	A. C.	M.	45	„ 26	„ 22	„ 24	—	Discrete	„	—	Inf.	—	20 years ago	—	412
689	2099	S. R.	F.	$\frac{3}{12}$	„ 26	—	—	—	Malignant	D.	Mar. 26	Unvaccinated		—	—	411
690	2100	S. F.	M.	24	„ 26	Mar. 24	Mar. 26	—	Discrete	Rec.	—	Inf.	—	—	—	243
691	2101	F. L.	M.	24	„ 26	„ 20	„ 23	—	Mild	„	—	Inf.	—	—	—	413
692	2102	M. A.	F.	20	„ 26	—	—	—	Discrete	„	—	Inf.	—	—	—	409
693	2104	E. G. N.	M.	7	„ 26	Mar. 24	Mar. 26	Mar. 31	Confluent	„	—	Unvaccinated		—	—	140
694	—	B. N.	F.	9	—	„ 26	„ 28	„ 31	Confluent	„	—	Unvaccinated		—	—	140
695	2105	V. M.	M.	$\frac{3}{12}$	Mar. 26	„ 26	„ 26	—	Mild	„	—	Mar. 7	—	—	A doubtful case	203
696	2106	W. S.	M.	36	„ 26	„ 24	„ 26	Mar. 30	Mild	„	—	Inf.	3 faint	—	—	414
697	2107	L. P.	F.	7	„ 26	„ 22	„ 24	—	Confluent	„	—	Unvaccinated		—	—	252
698	2555	M. W.	F.	5	Apr. 10	„ 29	Apr. 1	—	Discrete	„	—	Mar. 22	4 places	—	—	161
699	2109	A. J.	F.	36	Mar. 27	„ 22	Mar. 25	—	Discrete	„	—	Inf.	—	—	—	229
700	2110	E. M.	M.	3	„ 27	„ 25	„ 27	Mar. 29	Confluent	„	—	Unvaccinated		—	—	182
701	2111	A. S.	M.	47	„ 27	—	—	—	Mild	„	—	Inf.	—	—	—	244
702	2112	A. S.	F.	8	„ 27	Mar. 23	Mar. 26	—	Confluent	„	—	Unvaccinated		—	—	416
703	2113	J. R.	M.	1	„ 27	—	—	—	Confluent	D.	Apr. 3	Unvaccinated		—	Broncho pneumonia	240

No.	Name and Notification Number.	Sex.	Age.	Date of Notification.	Date of Onset.	Date of Rash.	Date of Removal to Hospital.	Type of Attack.	Result.	Date of Death.	Vaccination. Date.	Vaccination. No. of Marks.	Re-vaccination Date.	Remarks.	No. in House Register.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
704	2114 M. T.	F.	4	1896. Mar. 27	Mar. 24	Mar. 25	—	Malignant	D.	Mar. 28	Unvaccinated		—	In same family another child, aged $6\frac{1}{2}$, sickened on March 16, and died on 20th, from "inflammation of bowels," attributed to chill.	417
705	2115 A. W.	F.	29	,, 27	,, 22	,, 25	—	Discrete	Rec.	—	Inf.	—	Mar. 21	—	418
706	2116 M. N.	F.	5	,, 27	,, 23	,, 25	—	Confluent	,,	—	Unvaccinated		—	—	225
707	2117 A. M.	F.	28	,, 27	,, 23	,, 25	—	Malignant	D.	Mar. 29	Inf.	—	—	—	225
708	2118 W. P.	M.	32	,, 27	,, 25	,, 27	—	Discrete	Rec.	—	Inf.	—	—	—	252
709	2119 Mrs. S.	F.	50	,, 27	,, 25	,, 27	—	Discrete	,,	—	Inf.	—	—	—	272
710	2120 A. E.	F.	28	,, 27	,, 24	,, 25	—	Coherent	,,	—	Inf.	—	—	—	304
711	2121 C. G.	M.	34	,, 27	—	—	—	Malignant	D.	Apr. 1	Inf.	—	—	Cerebral hæmorrhage	419
712	2122 E. B.	F.	7	,, 27	Mar. 25	Mar. 27	Apr. 12	Discrete	Rec.	—	Unvaccinated		—	—	420
713	2123 A. H.	M.	37	,, 27	,, 23	,, 26	—	Confluent	,,	—	Inf.	—	—	—	421
714	2124 A. A.	F.	13	,, 28	,, 23	,, 24	—	Discrete	,,	—	Inf.	—	—	—	294
715	2125 T. M.	M.	$\frac{10}{12}$	,, 28	—	—	—	Confluent	D.	Apr. 1	Unvaccinated		—	—	182
716	2126 A. D.	F.	11	,, 28	Mar. 25	Mar. 27	—	Discrete	Rec.	—	Inf.	—	—	—	266
717	2127 A. B.	M.	7	,, 28	—	—	—	Confluent	D.	Apr. 2	Unvaccinated		—	Double panophthalmitis	365
718	2128 T. D.	M.	9	,, 28	Mar. 25	Mar. 27	—	Confluent	Rec.	—	Unvaccinated		—	—	266
719	2129 J. D.	M.	6	,, 28	,, 25	,, 27	—	Confluent	,,	—	Unvaccinated		—	—	266
720	2130 E. B.	F.	47	,, 28	,, 25	,, 27	—	Confluent	,,	—	Inf.	—	—	—	265
721	2131 B. N.	F.	6	,, 28	,, 26	,, 28	Mar. 29	Discrete	,,	—	Unvaccinated		—	Large pustules	170
722	2132 R. V.	M.	2	,, 28	,, 26	,, 28	Apr. 7	Discrete	,,	—	Unvaccinated		—	—	401
723	— J. V.	F.	15	—	,, 29	,, 29	—	Mild	,,	—	Inf.	—	—	A doubtful case	401
724	— P. V.	F.	7	—	Feb. 29	,, 2	—	Mild	,,	—	Unvaccinated		—	—	401
725	2133 M. P.	F.	25	Mar. 28	Mar. 21	,, 23	—	Mild	,,	—	Inf.	—	—	—	239
726	2134 E. H.	F.	35	,, 28	—	—	—	Discrete	,,	—	Inf.	—	—	—	272
727	2135 L. P.	F.	49	,, 28	Mar. 22	Mar. 24	—	Discrete	,,	—	Inf.	—	—	—	239
728	2136 H. B.	F.	48	,, 28	,, 27	,, 28	—	Discrete	,,	—	Inf.	—	—	—	293
729	2137 A. H.	F.	33	,, 28	,, 18	,, 20	—	Mild	,,	—	Inf.	—	—	—	237
730	2138 A. B.	M.	12	,, 28	,, 16	,, 18	—	Discrete	,,	—	Inf.	4 faint	Mar. 13 (1 slight).	Papules various sizes; no pustules.	422
731	2139 F. B.	F.	8	,, 28	,, 26	,, 28	—	Confluent	D.	Apr. 5	Unvaccinated		—	—	293
732	2140 Mrs. H.	F.	30	,, 28	—	—	—	Confluent	D.	Mar. 28	Inf.	—	—	—	423
733	2141 A. R.	F.	26	,, 28	Mar. 27	Mar. 28	—	Coherent	Rec.	—	Inf.	—	—	—	371
734	2142 E. S.	M.	2	,, 28	,, 25	,, 27	—	Coherent	,,	—	Unvaccinated		—	—	281
735	2143 W. D.	M.	28	,, 28	,, 26	,, 28	—	Confluent	,,	—	Inf.	—	—	—	317
736	2144 R. P.	F.	2	,, 28	,, 22	,, 24	—	Confluent	D.	Mar. 29	Unvaccinated		—	—	397
737	2145 E. M.	F.	21	,, 28	,, 24	,, 25	—	Coherent	Rec.	—	Inf.	—	—	—	116
738	2148 H. C.	F.	34	,, 28	,, 23	,, 25	—	Discrete	,,	—	Inf.	—	—	—	301
739	2146 L. C.	F.	25	,, 28	,, 23	,, 25	—	Confluent	D.	Apr. 3	Inf.	—	—	—	424
740	2147 A. P.	M.	3	,, 28	—	—	—	Confluent	D.	,, 6	Unvaccinated		—	—	425
741	2149 W. P.	M.	60	,, 28	—	—	—	Mild	Rec.	—	Inf.	—	—	—	246
742	2150 E. D.	F.	32	,, 28	Mar. 27	Mar. 28	—	Confluent	D.	Apr. 6	Inf.	—	—	—	426

743	2151	W. P.	M.	50	,, 29	,, 27	,, 29	—	Confluent	D.	Mar. 30	Unvaccinated		—	—	427
744	2152	W. S.	M.	8	,, 29	,, 22	,, 25	—	Confluent	Rec.	—	Unvaccinated		—	—	322
745	2153	R. F.	F.	20	,, 29	,, 25	,, 28	—	Coherent	,,	—	Inf.	—	—	—	428
746	2154	G. S.	F.	6	,, 29	,, 25	,, 28	—	Confluent	D.	Apr. 6	Unvaccinated		—	Hæmorrhage into pustules	429
747	2155	F. S.	F.	9	,, 29	,, 24	,, 26	Mar. 30	Coherent	Rec.	—	Unvaccinated		—	—	123
748	2156	T. B.	M.	33	,, 29	,, 23	,, 27	—	Coherent	,,	—	Inf.	—	—	—	430
749	2158	W. A.	M.	30	,, 29	,, 26	,, 28	Apr. 4	Coherent	,,	—	Inf.	5 plain	—	Large pustules; conjunctival hæmorrhage.	280
750	—	F. A.	M.	29	—	—	—	—	Discrete	,,	—	Inf.	—	—	—	280
751	2157	J. E.	M.	10	Mar. 29	Mar. 27	Mar. 29	—	Confluent	,,	—	Unvaccinated		—	—	307
752	2159	F. P.	F.	29	,, 29	—	—	—	Confluent	D.	Apr. 6	Inf.	—	—	—	297
753	2161	M. G.	F.	2	,, 29	Mar. 24	Mar. 27	—	Discrete	Rec.	—	Mar. 16	4	—	—	431
754	2163	C. L.	F.	23	,, 29	,, 26	,, 28	—	Confluent	,,	—	Inf.	—	Yes	—	274
755	2164	A. P.	F.	38	,, 29	,, 19	,, 23	—	Discrete	,,	—	Inf.	—	—	—	432
756	2166	M. A.	F.	71	,, 29	,, 26	,, 28	Mar. 29	Mild	,,	—	Inf.	2 faint	—	—	433
757	2167	C. H.	M.	12	,, 29	,, 28	,, 30	—	Mild	,,	—	Inf.	—	—	Minute papules	434
758	2169	W. N.	M.	2	,, 29	,, 26	,, 28	Mar. 29	Confluent	,,	—	Unvaccinated		—	—	170
759	2170	E. A.	F.	19	,, 29	,, 28	,, 29	—	Mild	,,	—	Inf.	—	—	—	294
760	2172	A. G. P.	M.	7	,, 29	,, 27	,, 29	—	Confluent	,,	—	Unvaccinated		—	—	332
761	2173	M. O.	F.	36	,, 29	,, 28	,, 29	—	Confluent	,,	—	Inf.	—	—	Induration and confluence of papules give aspect of elephantiasis.	435
762	2176	A. C.	F.	28	,, 29	,, 26	,, 28	—	Mild	,,	—	Inf.	—	Mar. 23	—	436
763	—	E. T.	M.	22	—	About Feb. 25		—	Mild	,,	—	Inf.	—	Twice, *nil*	—	436
764	2177	E. C.	F.	43	Mar. 30	Mar. 25	Mar. 28	—	Discrete	,,	—	Inf.	—	Mar. 19 (3)	—	437
765	2178	E. B.	F.	24	,, 30	,, 27	,, 29	—	Coherent	,,	—	Inf.	—	7 years ago	—	291
766	2179	A. F.	F.	26	,, 30	,, 26	,, 28	—	Discrete	,,	—	Inf.	—	—	—	438
767	2181	A. M.	F.	29	,, 30	,, 29	,, 30	—	Discrete	,,	—	Inf.	—	—	—	439
768	2182	E. G.	F.	38	,, 30	,, 29	,, 30	—	Confluent	D.	Mar. 31	Inf.	—	Mar. 16	—	260
769	2183	E. C.	F.	34	,, 30	,, 25	,, 27	—	Discrete	Rec.	—	Inf.	—	—	—	440
770	2185	J. S.	M.	30	,, 30	,, 27	,, 30	—	Discrete	,,	—	Inf.	—	—	—	441
771	2461	W. R.	M.	45	Apr. 7	Apr. 2	Apr. 2	—	Discrete	D.	Apr. 6	Inf.	—	—	"Phthisis"	962
772	2190	T. W.	M.	23	Mar. 30	Mar. 24	Mar. 27	—	Confluent	Rec.	—	Inf.	—	—	—	442
773	2191	Mrs. T.	F.	23	,, 30	,, 24	,, 26	—	Discrete	,,	—	Inf.	—	—	—	443
774	2192	L. M.	F.	5	,, 30	,, 26	,, 28	—	Confluent	D.	Apr. 4	Mar. 21	—	—	—	444
775	2193	W. N.	M.	14	,, 30	,, 24	,, 26	—	Mild	Rec.	—	Inf.	—	—	—	445
776	2194	A. C.	F.	9	,, 30	,, 10	,, 12	—	Mild	,,	—	Inf.	—	—	—	301
777	2195	M. C.	F.	$\frac{11}{12}$	,, 30	,, 23	,, 25	—	Confluent	D.	Apr. 7	Unvaccinated		—	—	301
778	2196	C. P.	F.	7	,, 30	,, 22	,, 24	—	Confluent	Rec.	—	Unvaccinated		—	—	446
779	2197	A. P.	M.	11	,, 30	,, 26	,, 28	Mar. 30	Discrete	,,	—	Inf.	—	—	—	447
780	2198	W. B.	M.	6	,, 30	,, 21	,, 22	—	Confluent	,,	—	Unvaccinated		—	—	248
781	2199	W. G.	M.	23	,, 30	,, 14	,, 18	—	Mild	,,	—	Inf.	3 foveate	—	—	448
782	2200	H. P.	F.	26	,, 30	,, 26	,, 28	Mar. 30	Confluent	D.	Apr. 4	Inf.	—	—	Syphilis. Delirium. Vomiting	298
783	2201	G. S.	F.	3	,, 30	—	—	—	Coherent	Rec.	—	Unvaccinated		—	—	449
784	2202	T. S.	M.	53	,, 30	Mar. 27	Mar. 29	—	Mild	,,	—	Inf.	—	—	—	450
785	2203	H. D.	M.	4	,, 30	,, 28	,, 30	Apr. 14	Mild	,,	—	Unvaccinated		—	—	451
786	2204	H. H.	M.	34	,, 30	,, 28	,, 29	—	Discrete	,,	—	Inf.	—	—	—	237
787	2205	B. M.	M.	9	,, 30	,, 22	,, 24	—	Confluent	,,	—	Unvaccinated		—	—	452
788	2206	E. M.	F.	25	,, 30	,, 24	,, 26	—	Discrete	,,	—	Inf.	—	—	—	453
789	2207	E. M.	M.	47	,, 30	,, 26	,, 28	—	Coherent	,,	—	Aged 12 years.	—	—	—	452
790	2208	B. M.	F.	5	,, 30	,, 22	,, 24	—	Confluent	,,	—	Unvaccinated		—	—	452
791	2209	E. G.	F.	11	,, 30	,, 29	,, 30	—	Mild	,,	—	Inf.	4 foveate	—	Very few papules	142
792	2210	E. M.	M.	$\frac{9}{12}$	,, 30	,, 26	,, 28	—	Discrete	,,	—	Unvaccinated		—	—	452

No.	Name and Notification Number.		Sex.	Age.	Date of Notification.	Date of Onset.	Date of Rash.	Date of Removal to Hospital.	Type of Attack.	Result.	Date of Death.	Vaccination. Date.	Vaccination. No. of Marks.	Re-vaccination Date.	Remarks.	No. in House Register.
1.	2.		3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13	14.	15.	16.
793	2211	E. E.	M.	2	1896. Mar. 30	Mar. 25	Mar. 27	—	Coherent	Rec.	—	Mar. 18	1 vesicle	—	———	275
794	2212	J. A.	F.	1	„ 30	„ 27	„ 29	—	Confluent	„	—	Unvaccinated		—	———	407
795	2214	G. L.	F.	8	„ 31	„ 26	„ 29	—	Confluent	„	—	Unvaccinated		—	———	454
796	2215	E. C.	M.	44	„ 31	„ 28	„ 30	—	Coherent	„	—	Inf.	—	—	———	301
797	2216	W. L.	M.	58	„ 31	„ 28	„ 30	—	Confluent	„	—	Inf.	—	—	———	360
798	2217	R. L.	F.	3	„ 31	„ 26	„ 29	—	Coherent	„	—	Unvaccinated		—	———	454
799	2218	B. S.	F.	1	„ 31	„ 26	„ 28	—	Coherent	„	—	Unvaccinated		—	———	281
800	2219	M. A. W.	F.	32	„ 31	„ 25	„ 27	Mar. 31	Confluent	D.	Apr. 6	Inf.	Alleged	—	Marks not discernible	455
801	2221	C. B.	M.	11	„ 31	„ 27	„ 29	—	Confluent	Rec.	—	Unvaccinated		—	Probably contracted through an inmate of house visiting a small-pox case 14 days before he sickened.	456
802	2220	S. J. P.	M.	$\frac{8}{12}$	„ 31	„ 29	„ 31	—	Confluent	D.	Apr. 3	Unvaccinated		—	———	239
803	2222	J. H.	M.	25	„ 31	„ 25	„ 27	—	Mild	Rec.	—	Inf.	—	—	———	250
804	2223	C. G.	F.	49	„ 31	„ 25	„ 28	—	Discrete	„	—	Inf.	—	—	———	296
805	2224	L. N. G.	M.	8	„ 31	„ 26	„ 29	—	Confluent	„	—	Unvaccinated		—	———	457
806	2225	C. W.	M.	46	„ 31	„ 29	„ 31	—	Malignant	D.	Mar. 31	Inf.	4	—	———	458
807	2226	M. M.	F.	24	„ 31	„ 27	„ 30	—	Mild	Rec.	—	Inf.	—	Mar. 23	———	459
808	2227	J. W.	M.	23	„ 31	„ 30	Apr. 1	Apr. 2	Discrete	„	—	Inf.	4 faint	—	———	460
809	2228	R. L.	M.	39	„ 31	„ 27	Mar. 29	—	Mild	„	—	Inf.	—	—	———	461
810	2229	A. M.	F.	22	„ 31	„ 23	„ 27	—	Mild	„	—	Inf.	—	Mar. 17	———	462
811	2230	Mrs. T.	F.	51	„ 31	„ 27	„ 29	—	Confluent	D.	Apr. 6	Inf.	—	—	———	463
812	2231	K. L.	F.	9	„ 31	„ 28	„ 29	—	Discrete	Rec.	—	Unvaccinated		—	———	464
813	2232	L. J.	F.	24	„ 31	„ 25	„ 29	—	Discrete	„	—	Inf.	—	Mar. 29, nil.	———	465
814	2234	R. H.	F.	10	„ 31	„ 28	„ 30	—	Confluent	„	—	Unvaccinated		—	———	466
815	2235	C. C.	M.	3	„ 31	„ 28	„ 30	Apr. 1	Confluent	D.	Apr. 7	Mar. 28	—	—	Laryngitis	358
816	2236	A. B.	F.	17	„ 31	„ 28	„ 31	„ 1	Confluent	Rec.	—	Inf.	—	—	———	467
817	3338	G. M.	F.	4	May 30	May 26	May 29	—	Confluent	„	—	Unvaccinated		—	Convulsions followed immersion in bath.	1005
818	2237	A. V.	F.	17	Mar. 31	Mar. 22	Mar. 25	—	Discrete	„	—	Inf.	—	—	———	251
819	2238	E. P.	F.	1	„ 31	„ 31	Apr. 2	—	Discrete	„	—	Unvaccinated		—	———	356
820	2248	E. K.	F.	$\frac{4}{12}$	„ 31	„ 27	Mar. 29	—	Confluent	D.	Apr. 7	Unvaccinated		—	———	125
821	2240	N. K.	F.	8	„ 31	„ 29	„ 31	—	Discrete	Rec.	—	Inf.	4 large	—	Papules of various sizes	468
822	2241	F. B.	M.	11	„ 31	„ 24	„ 26	—	Mild	„	—	Inf.	4	Mar. 27	———	265
823	2242	B. B.	M.	3	„ 31	„ 27	„ 30	—	Confluent	D.	Apr. 9	Mar. 27	—	—	———	265
824	2243	A. V.	F.	39	„ 31	„ 27	„ 29	—	Coherent	Rec.	—	Inf.	—	—	———	251
825	2244	A. P.	M.	23	„ 31	„ 24	„ 26	Apr. 2	Discrete	„	—	Inf.	—	—	———	469
826	2245	— A.	M.	8 days	„ 31	—	—	—	Malignant	D.	Apr. 1	Unvaccinated		—	———	407
827	—	R. K.	M.	8	„ 31	—	—	—	Coherent	Rec.	—	Mar. 1	—	—	———	125
828	2249	E. M.	F.	7	„ 31	—	—	—	Confluent	D.	Apr. 22	Unvaccinated		—	———	182
829	2250	E. P.	M.	$\frac{3}{12}$	„ 31	Mar. 29	Mar. 30	—	Confluent	D.	„ 12	Mar. 24	—	—	———	316
830	—	A. E. P.	F.	13	—	„ 27	„ 29	—	Mild	Rec.	—	Inf.	4	Mar. 24	———	316
831	2251	A. M.	F.	25	Mar. 31	„ 26	„ 28	—	Mild	„	—	Inf.	—	—	———	452

832	2253	C. D.	F.	14	„ 31	„ 29	„ 31	—	Mild	„	—	Inf.	—	—	—	397
833	—	L. P.	F.	7	—	—	—	—	Mild	„	—	Unvaccinated		—	—	397
834	2255	F. D.	M	18	Mar. 31	„ 30	Apr. 1	Apr. 3	Confluent	„	—	Inf.	—	—	—	470
835	2256	C. T.	F.	24	Apr. 1	„ 30	„ 1	—	Confluent	„	—	Inf.	—	—	—	338
836	2257	W. H.	M.	42	„ 1	„ 30	„ 1	Apr. 2	Malignant	D.	Apr. 4	Inf.	2 faint	—	—	131
837	2258	B. C.	M.	4	„ 1	„ 28	Mar. 30	„ 1	Confluent	D.	„ 7	Mar. 28	—	—	—	358
838	2360	F. L.	M.	7	„ 4	Mar. 6	„ 8	„ 5	Confluent	Rec.	—	Unvaccinated		—	Had been ill 4 weeks before it came to knowledge of authorities.	472
839	2361	M. L.	F.	6	„ 4	„ 6	„ 8	„ 5	Discrete	„	—	Unvaccinated		—		472
840	—	E. M.	F.	45	—	—	—	—	Mild	„	—	Inf.	—	—	—	444
841	2259	L. M.	F.	7	Apr. 1	Mar. 26	Mar. 28	Apr. 2	Coherent	„	—	Unvaccinated		—	—	473
842	2260	W. P.	M.	46	„ 1	„ 30	Apr. 1	—	Malignant	D.	Apr. 3	Inf.	—	—	Suffered from asthma	342
843	2261	C. L.	M.	5	„ 1	„ 29	Mar. 31	—	Confluent	D.	„ 12	Unvaccinated		—	—	464
844	2262	A. F.	M.	30	„ 1	„ 27	„ 29	—	Malignant	D.	„ 5	Inf.	—	—	—	474
845	2263	G. J.	M.	19	„ 1	„ 29	„ 31	—	Malignant	D.	„ 2	Inf.	—	—	—	475
846	2264	S. V.	M.	$\frac{7}{12}$	„ 1	—	—	—	Confluent	D.	Mar. 31	Unvaccinated		—	—	476
847	2265	T. B.	M.	34	„ 1	—	—	—	Mild	Rec.	—	Inf.	—	—	—	477
848	2266	L. G.	F.	35	„ 1	Mar. 28	Mar. 30	Apr. 3	Mild	„	—	Inf.	2 plain, 1 faint	—	—	318
849	2267	S. L.	F.	28	„ 1	„ 21	„ 26	—	Confluent	„	—	Inf.	4 scars	—	—	478
850	2268	H. G.	M.	37	„ 1	„ 29	Apr. 1	Apr. 3	Discrete	„	—	Inf.	1 plain	—	—	318
851	3036	V. G.	F.	3	„ 30	Apr. 28	„ 30	May 2	Coherent	„	—	1 week before.	2 vesicles	—	Pustules of various sizes; some minute.	318
852	2269	H. E.	M.	28	„ 1	Mar. 30	„ 1	Apr. 4	Discrete	„	—	Inf.	2 faint	—	—	307
853	2270	W. S.	M.	53	„ 1	—	—	—	Discrete	„	—	Inf.	—	—	—	479
854	2271	R. S.	M.	$\frac{10}{12}$	„ 1	Mar. 28	Mar. 29	—	Confluent	„	—	Unvaccinated		—	—	480
855	2272	J. W.	F.	29	„ 1	„ 27	„ 31	—	Confluent	„	—	Inf.	—	—	—	481
856	2273	G. H.	F.	2 wks.	„ 1	—	—	—	Confluent	„	—	Unvaccinated		—	—	171
857	2274	G. W.	F.	23	„ 1	Mar. 28	Mar. 29	—	Mild	„	—	Inf.	—	—	—	286
858	2275	J. B.	M.	25	„ 1	„ 31	Apr. 2	—	Confluent	„	—	Inf.	—	—	—	482
859	—	J. B.	F.	24	—	„ 23	Mar. 26	—	Mild	„	—	Inf.	—	—	—	482
860	2276	J. H.	F.	4	Apr. 1	„ 28	„ 30	—	Confluent	D.	Apr. 12	Mar. 20	—	—	—	221
861	—	H. M.	M.	36	—	Mar. 26	„ 28	—	Discrete	Rec.	—	Inf.	—	—	—	221
862	2277	E. V.	F.	9	Apr. 1	„ 31	„ 31	—	Mild	„	—	Inf.	—	—	—	251
863	2279	G. H.	F.	2	„ 1	„ 30	Apr. 1	—	Discrete	„	—	Unvaccinated		—	—	359
864	2281	F. W.	F.	7	„ 1	„ 24	Mar. 26	—	Mild	„	—	9 days before.	—	—	—	483
865	2282	P. J.	M.	5	„ 1	„ 29	„ 31	—	Confluent	„	—	Unvaccinated		—	—	484
866	2283	A. P.	F.	16	„ 1	„ 28	„ 30	Apr. 2	Discrete	„	—	Inf.	4 plain	—	—	486
867	2884	L. W.	F.	9	„ 1	„ 30	„ 31	—	Mild	„	—	Inf.	2 faint	Mar. 25	—	389
868	2285	H. K.	M.	2	„ 1	„ 24	„ 26	—	Confluent	D.	Apr. 18	Mar. 25	—	—	—	337
869	2286	W. P.	M.	23	„ 1	„ 30	Apr. 1	Apr. 4	Confluent	Rec.	—	Inf.	4 plain	—	Hæmorrhage into pustules	487
870	2287	E. W.	F.	3	„ 1	„ 30	„ 1	—	Discrete	„	—	Unvaccinated		—	—	485
871	2288	F. K.	F.	5	„ 1	„ 25	Mar. 27	—	Discrete	„	—	Mar. 25	—	—	—	337
872	2289	E. S.	M.	24	„ 2	„ 28	„ 31	—	Mild	„	—	Inf.	—	—	—	489
873	2290	E. S.	F.	17	„ 2	Apr. 3	Apr. 5	Apr. 9	Discrete	„	—	Inf.	2 faint	—	—	123
874	2291	E. S.	F.	13	„ 2	Mar. 31	„ 2	„ 9	Mild	„	—	Inf.	4 plain	—	—	123
875	2292	C. H.	M.	4	„ 2	„ 28	Mar. 30	—	Discrete	„	—	Unvaccinated		—	—	490
876	2293	E. K.	F.	60	„ 2	„ 28	„ 30	—	Coherent	„	—	Inf.	—	—	—	491
877	2294	J. W.	F.	42	„ 2	„ 31	Apr. 2	Apr. 3	Mild	„	—	Inf.	3 plain	—	—	488
878	2295	J. R.	M.	5	„ 2	—	—	—	Coherent	„	—	Unvaccinated		—	—	492
879	2296	A. B.	F.	3	„ 2	Mar. 30	Apr. 1	—	Coherent	„	—	Unvaccinated		—	—	493
880	2297	D. N.	M.	6	„ 2	„ 26	Mar. 28	—	Confluent	D.	Apr. 10	Unvaccinated		—	—	303
881	2298	G. N.	M.	8	„ 2	„ 26	„ 28	—	Confluent	D.	„ 10	Unvaccinated		—	—	303

No.	Name and Notification Number.		Sex.	Age.	Date of Notification.	Date of Onset.	Date of Rash.	Date of Removal to Hospital.	Type of Attack.	Result.	Date of Death.	Vaccination. Date.	Vaccination. No. of Marks.	Re-vaccination Date.	Remarks.	No. in House Register.
1.	2.		3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	18.	14.	15.	16.
882	2299	E. J.	F.	21	1896. Apr. 2	Mar. 30	Apr. 1	—	Mild	Rec.	—	Inf.	—	—	Attempt at re-vaccination one month ago; result nil.	369
883	2300	J. T.	M.	5	„ 2	„ 30	„ 1	—	Confluent	„	—	Unvaccinated		—	—	357
884	2301	E. C.	F.	5	„ 2	„ 29	„ 2	Apr. 4	Confluent	„	—	Mar. 28	—	—	Double panopthalmitis; a most severe case.	358
885	2302	L. R.	F.	24	„ 2	„ 30	„ 1	—	Discrete	„	—	Inf.	—	—	—	494
886	2303	A. B.	M.	5	„ 2	„ 26	Mar. 28	—	Confluent	„	—	Unvaccinated		—	—	495
887	2304	J. O.	M.	14	„ 2	—	—	—	Mild	„	—	Inf.	—	Apr. 9	—	496
888	2305	G. S.	M.	43	„ 2	Mar. 28	Mar. 30	Apr. 3	Confluent	„	—	Inf.	3 faint	—	—	497
889	2306	A. G.	M.	16	„ 3	„ 30	Apr. 2	—	Confluent	„	—	Inf.	—	—	—	498
890	2317	A. F. P.	F.	$\frac{6}{12}$	„ 3	„ 27	Mar. 29	—	Discrete	„	—	Unvaccinated		—	Subject to eczema	501
891	2308	T. M.	M.	4	„ 3	„ 28	„ 30	Apr. 2	Confluent	„	—	Unvaccinated		—	—	289
892	2309	R. J. R.	F.	37	„ 3	—	—	—	Discrete	„	—	Unvaccinated		—	Said to have had small-pox in childhood; no marks of vaccination.	324
893	2310	E. B.	F.	32	„ 3	Mar. 29	Mar. 31	—	Coherent	„	—	Inf.	—	—	—	324
894	2312	L. B.	M.	4	„ 3	„ 30	Apr. 1	—	Confluent	D.	Apr. 5	Unvaccinated		—	—	324
895	2313	W. M.	M.	8	„ 3	„ 29	Mar. 31	Apr. 2	Mild	Rec.	—	Unvaccinated		—	Simulating varicella	289
896	2314	J. M.	F.	10	„ 3	„ 29	„ 31	„ 2	Mild	„	—	Inf.	—	—	—	289
897	2315	L. M.	F.	2	„ 3	Mar. 28	Mar. 30	„ 2	Confluent	D.	Apr. 30	Unvaccinated		—	Tuberculous disease of bone and glands. Comatose for a week before death. ? Meningitis.	289
898	2316	M. S.	F.	13	„ 3	„ 27	„ 29	—	Discrete	Rec.	—	Inf.	—	—	—	220
899	2307	W. H.	M.	6	„ 3	Apr. 1	Apr. 3	Apr. 8	Malignant	D.	Apr. 9	Unvaccinated		—	—	499
900	2318	W. P.	M.	9	„ 3	„ 1	„ 3	—	Discrete	Rec.	—	Unvaccinated		—	—	332
901	2319	K. P.	F.	11	„ 3	„ 1	„ 3	—	Confluent	D.	Apr. 15	Unvaccinated		—	—	332
902	2320	E. P.	F.	13	„ 3	„ 1	„ 3	—	Discrete	Rec.	—	Unvaccinated		—	—	332
903	2322	W. R.	M.	29	„ 3	„ 1	„ 3	—	Discrete	„	—	Inf.	—	—	—	349
904	2323	J. G.	M.	29	„ 3	Mar. 28	„ 1	—	Discrete	„	—	Inf.	—	—	—	500
905	2324	A. M.	F.	28	„ 3	Apr. 4	„ 6	Apr. 7	Confluent	D.	Apr. 11	Unvaccinated		—	3 attempts at vaccination without result.	473
906	2325	K. C.	F.	19	„ 3	Mar. 31	„ 2	„ 4	Discrete	Rec.	—	Inf.	3 foveate	—	—	358
907	2326	J. G.	F.	29	„ 3	Apr. 1	„ 3	„ 7	Confluent	„	—	Inf. ?	No marks	—	—	506
908	2327	F. W.	F.	13	„ 3	Mar. 31	„ 2	—	Confluent	„	—	Unvaccinated		—	—	504
909	2328	E. P.	F.	30	„ 3	Apr. 1	„ 4	—	Confluent	„	—	Unvaccinated		—	—	502
910	2329	J. H.	M.	30	„ 3	—	—	—	Confluent	D	Apr. 13	Inf.	—	—	—	503
911	2330	E. A.	F.	38	„ 3	Mar. 30	Apr. 1	—	Discrete	Rec.	—	Inf.	—	March 29 (4)	—	376
912	2331	K. O.	F.	9	„ 3	—	—	—	Confluent	„	—	Unvaccinated		—	—	505
913	2334	J. E.	F.	33	„ 3	Apr. 1	Apr. 3	Apr. 4	Mild	„	—	Inf.	4 plain	—	—	307
914	2335	G. L.	M.	$\frac{5}{12}$	„ 3	Mar. 29	Mar. 31	—	Malignant	D.	Apr. 5	Unvaccinated		—	—	370
915	2336	W. W.	M.	52	„ 4	„ 31	Apr. 2	—	Confluent	D.	„ 7	Inf.	—	—	—	285
916	2337	E. P.	F.	4	„ 4	„ 29	„ 2	Apr. 9	Coherent	Rec.	—	Mar. 31	—	—	—	297
917	—	F. M.	M.	17	—	—	—	—	Mild	„	—	Inf.	—	—	—	444
918	2340	F. H.	M.	6	Apr. 4	Mar. 28	Apr. 2	—	Coherent	„	—	Unvaccinated		—	—	507

919	2341	E. B.	M.	26	„ 4	Mar. 30	Apr. 1	Apr. 8	Malignant	D.	Apr. 13	Inf.	?	—	Marks not discernible	508
920	2343	L. M.	F.	$\frac{4}{12}$	„ 4	—	—	—	Confluent	D.	„ 4	Unvaccinated		—	—	289
921	2344	E. M.	F.	17	„ 4	Apr. 1	Apr. 3	—	Coherent	Rec.	—	Inf.	—	—	—	509
922	2345	M. M.	F.	12	„ 4	Mar. 31	„ 2	—	Coherent	„	—	Inf.	4 large	—	—	510
923	2346	P. W.	M	3	„ 4	„ 29	„ 1	—	Confluent	„	—	Unvaccinated		—	—	511
924	2347	S. A.	F.	52	„ 4	Apr. 1	„ 3	—	Confluent	„	—	Inf.	—	—	—	512
925	2348	A. C.	F.	5	„ 4	—	—	—	Confluent	D.	Apr. 13	Unvaccinated		—	—	513
926	2349	W. T.	M.	18	„ 4	Apr. 2	Apr. 4	Apr. 7	Mild	Rec.	—	At 2 yrs. of age.	4 plain	—	—	514
927	2350	E. W.	F.	19	„ 4	Mar. 25	„ 2	—	Discrete	„	—	Inf.	—	—	—	515
928	2351	H. D.	M.	9	„ 4	—	—	—	Mild	„	—	Inf.	—	—	—	516
929	2352	E. R.	F.	29	„ 4	Mar. 28	Apr. 3	—	Mild	„	—	Inf.	4 scars	—	—	517
930	2353	A. A.	M.	9	„ 4	Apr. 2	„ 4	—	Confluent	„	—	Unvaccinated		—	—	518
931	2354	G. E.	M.	$\frac{9}{12}$	„ 4	„ 1	„ 3	—	Confluent	D.	Apr. 9	Unvaccinated		—	—	519
932	2355	A. N.	F.	5	„ 4	„ 1	„ 3	—	Confluent	Rec.	—	Unvaccinated		—	—	303
933	2356	H. P.	M.	28	„ 4	—	—	—	Confluent	D.	Apr. 17	Inf.	—	—	—	520
934	2357	T. R. R.	M.	30	„ 4	—	—	—	Mild	Rec.	—	Inf.	—	—	—	521
935	2358	B. P.	F.	15	„ 4	Apr. 2	Apr. 4	Apr. 7	Mild	„	—	Inf.	2 foveate	—	—	522
936	2359	J. H. F.	M.	56	„ 4	—	—	—	Discrete	„	—	Inf.	—	Mar. 27	—	523
937	2362	C. P.	M.	22	„ 4	—	—	—	Confluent	D.	Apr. 11	Inf.	—	—	—	524
938	2363	L. M. H.	F.	9	„ 5	Apr. 1	Apr. 3	Apr. 6	Confluent	Rec.	—	Unvaccinated		—	—	525
939	2364	K. C.	F.	35	„ 5	Mar. 31	„ 3	—	Mild	„	—	Inf.	—	20 years ago	—	526
940	2365	E. P.	F.	27	„ 5	„ 29	„ 4	—	Mild	„	—	Inf.	—	—	—	527
941	2366	C. J.	F.	22	„ 5	Apr. 3	„ 5	Apr. 7	Mild	„	—	Inf.	2 plain (r) 2 plain (l)	—	—	528
942	2367	E. J.	M.	23	„ 5	—	—	—	Mild	„	—	Inf.	—	—	—	529
943	2368	S. O.	M.	7	„ 5	Apr. 1	Apr. 3	—	Malignant	D.	Apr. 8	Unvaccinated		—	—	530
944	2369	M. C.	F.	13	„ 5	„ 3	„ 5	—	Confluent	Rec.	—	Inf.	4 large scars	—	—	526
945	2370	W. F.	M.	28	„ 5	„ 2	„ 4	Apr. 5	Coherent	„	—	Inf.	1 plain 1 faint	—	—	531
946	2371	J. C. M.	M.	20	„ 5	Mar. 31	„ 2	—	Malignant	D.	Apr. 4	Unvaccinated		—	Information from neighbours	532
947	2372	A. W.	M.	21	„ 5	„ 31	„ 2	—	Discrete	Rec.	—	Inf.	4 foveate	—	—	533
948	2373	J. N.	F.	16	„ 5	Apr. 2	„ 4	Apr. 6	Mild	„	—	Inf.	—	—	—	534
949	2374	F. G.	F.	5	„ 5	—	—	—	Confluent	„	—	Unvaccinated		—	—	535
950	2375	J. M.	M.	18	„ 5	Apr. 3	Apr. 5	Apr. 6	Mild	„	—	Inf.	—	—	—	536
951	2376	J. C.	M.	32	„ 5	„ 2	„ 4	„ 6	Confluent	D.	Apr. 15	Inf.	4 faint	—	Hæmorrhage into pustules	391
952	2377	A. C.	F.	2	„ 5	„ 2	„ 4	—	Discrete	Rec.	—	Mar. 23	—	—	Papules of various sizes	391
953	2378	G. W.	F.	2	„ 5	„ 2	„ 4	—	Confluent	„	—	Unvaccinated		—	—	161
954	2379	A. W.	F.	$\frac{1}{12}$	„ 5	„ 2	„ 4	—	Confluent	D.	May 1	Unvaccinated		—	—	161
955	2380	P. (Infant)	M.	8 days	„ 5	—	—	—	Malignant	D.	Apr. 4	Unvaccinated		—	—	297
956	2383	L. R.	F.	29	„ 5	Apr. 3	Apr. 5	Apr. 7	Confluent	Rec.	—	Inf.	5 plain	—	—	537
957	2384	P. R.	M.	8	„ 5	„ 2	„ 4	„ 7	Confluent	„	—	Unvaccinated		—	—	537
958	2386	H. N.	M.	27	„ 5	Mar. 30	„ 1	—	Mild	„	—	Inf.	3 good	—	—	366
959	2387	L. H.	F.	4	„ 5	Apr. 1	„ 3	Apr. 8	Malignant	D.	Apr. 10	Unvaccinated		—	—	499
960	2388	M. H.	F.	2	„ 5	„ 1	„ 3	„ 8	Confluent	D.	„ 12	Unvaccinated		—	With hæmorrhage	499
961	2389	E. B.	F.	55	„ 5	„ 1	„ 3	—	Discrete	Rec.	—	Inf.	—	—	—	433
962	2390	L. L.	F.	15	„ 5	„ 2	„ 4	Apr. 7	Mild	„	—	Inf.	3 plain	Mar. 31 (4)	—	539
963	2391	M. W.	F.	6	„ 5	„ 4	„ 5	—	Coherent	„	—	Mar. 25	—	—	—	389
964	2392	W. W.	M.	42	„ 5	„ 3	„ 4	—	Discrete	„	—	Inf.	—	Mar. 25	—	389
965	2393	F. W.	M.	10	„ 5	„ 4	„ 6	—	Discrete	„	—	Inf.	2 plain	Mar. 25	—	389
966	2394	R. M.	F.	56	„ 5	Mar. 29	„ 1	—	Discrete	„	—	Inf.	—	—	—	362
967	2395	E. D.	F.	12	„ 5	„ 30	„ 1	—	Discrete	„	—	Inf.	—	—	—	538
968	2396	M. S.	F.	24	„ 5	Apr. 1	„ 4	—	Confluent	„	—	Inf.	—	—	—	538
969	2397	E. B.	F.	27	„ 6	Mar. 29	Mar. 31	Apr. 6	Confluent	„	—	Inf.	?	—	Marks not discernible	540

No.	Name and Notification Number.		Sex.	Age.	Date of Notification.	Date of Onset.	Date of Rash.	Date of Removal to Hospital.	Type of Attack.	Result.	Date of Death.	Vaccination. Date.	Vaccination. No. of Marks.	Re-vaccination Date.	Remarks.	No. in House Register.
1.	2.		3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
970	2398	A. C. - -	F.	19	1896. Apr. 6	Apr. 3	Apr. 5	Apr. 6	Discrete -	Rec.	—	Inf.	3 foveate	—	——	541
971	2399	J. R. E. - -	M.	28	„ 6	„ 3	„ 5	„ 6	Confluent -	D.	Apr. 10	Unvaccinated		—	Vaccinated April 1. Nil -	148
972	2400	L. H. - -	F.	14	„ 6	—	—	—	Mild - -	Rec.	—	Inf.	—	—	——	542
973	2401	F. T. - - -	F.	31	„ 6	Apr. 1	Apr. 3	—	Discrete -	„	—	Inf.	—	—	——	394
974	2402	J. L. - -	M.	28	„ 6	„ 1	„ 3	—	Mild - -	„	—	Inf.	—	Apr. 2. Nil	——	543
975	2403	P. S. - - -	M.	4	„ 6	„ 6	„ 8	Apr. 12	Confluent -	D.	Apr. 14	Unvaccinated		—	With hæmorrhage - -	544
976	2404	R. R. - -	M.	53	„ 6	—	—	—	Mild - -	Rec.	—	At 8 yrs.	—	—	——	545
977	2405	J. F. - - -	M.	34	„ 6	Apr. 2	Apr. 5	—	Coherent -	„	—	Inf.	—	Aged 14. Nil	——	546
978	2406	L. P. - -	F.	32	„ 6	—	—	—	Confluent -	„	—	Inf.	—	—	——	547
979	—	M. W. - -	F.	6	—	Apr. 6	Apr. 8	—	Confluent -	„	—	Unvaccinated		—	——	739
980	2408	S. H. - -	F.	52	Apr. 6	—	—	—	Discrete -	„	—	Inf.	—	—	——	549
981	2409	J. D. - - -	M.	38	„ 6	Apr. 5	Apr. 7	Apr. 8	Confluent -	„	—	Inf.	2 plain	—	Petechiæ - - -	550
982	2410	G. P. - -	F.	8	„ 6	„ 2	„ 4	—	Confluent -	„	—	Unvaccinated		—	——	502
983	2411	S. Y. - - -	M.	19	„ 6	—	—	—	Confluent -	„	—	Unvaccinated		—	——	551
984	2412	H. R. - -	M.	$1\frac{7}{12}$	„ 6	„ 3	Apr. 5	—	Coherent -	„	—	Unvaccinated		—	——	552
985	2413	G. D. - - -	M.	8	„ 6	„ 4	„ 6	Apr. 7	Confluent -	„	—	Unvaccinated		—	——	553
986	2414	G. P. - -	M.	25	„ 6	„ 4	„ 6	—	Coherent -	„	—	Inf.	—	—	——	554
987	2415	S. S. - - -	F.	66	„ 6	„ 1	„ 3	—	Mild - -	„	—	Inf.	—	—	——	344
988	2416	M. B. - -	F.	22	„ 6	„ 3	„ 5	—	Coherent -	„	—	Inf.	—	—	——	555
989	2417	F. H. - -	M.	34	„ 6	„ 4	„ 6	—	Discrete -	„	—	Inf.	—	—	——	576
990	2418	W. P. - -	M.	8	„ 6	Mar. 30	„ 1	Apr. 9	Confluent -	„	—	Unvaccinated		—	——	557
991	2419	F. A. - -	F.	15	„ 6	Apr. 3	„ 6	—	Mild - -	„	—	Inf.	—	—	——	96
992	2420	E. B. - -	F.	15	„ 6	„ 3	„ 5	—	Mild - -	„	—	Inf.	4 good	—	——	223
993	2421	A. A. - -	F.	8	„ 6	„ 3	„ 6	—	Confluent -	„	—	Unvaccinated		—	——	96
994	2422	A. H. - -	M.	6	„ 6	—	—	—	Confluent -	D.	Apr. 11	Unvaccinated		—	——	558
995	2423	L. G. - -	F.	42	„ 6	Apr. 4	Apr. 6	Apr. 9	Discrete -	Rec.	—	Inf	1 good	—	——	559
996	2424	C. L. - -	F.	$\frac{5}{22}$	„ 6	„ 3	„ 5	—	Mild - -	„	—	Unvaccinated		—	——	320
997	2425	A. L. - -	F.	22	„ 6	Mar. 27	Mar. 29	—	Discrete -	„	—	Inf.	—	—	——	320
998	2426	M. O. - -	F.	37	„ 6	Apr. 3	Apr. 5	Apr. 7	Coherent -	„	—	Inf.	No marks visible.	—	Large indurated papules - -	560
999	2428	E. H. - -	F.	9	„ 6	Mar. 29	Mar. 31	„ 7	Confluent -	D.	Apr. 16	Unvaccinated		—	——	561
1000	2429	G. H. - -	F.	7	„ 6	Mar. 30	Apr. 1	„ 7	Confluent -	D.	„ 10	Apr. 1	—	—	——	561
1001	2430	B. W. - -	F.	67	„ 7	Apr. 4	„ 6	„ 7	Mild - -	Rec.	—	Inf.	No marks	—	Small-pox at age of 12 years -	562
1002	2431	J. R. - - -	M.	9	„ 7	Mar. 26	Mar. 28	„ 4	Confluent -	„	—	Unvaccinated		—	——	507
1003	2432	G. T. - -	F.	2	„ 7	Apr. 3	Apr. 5	—	Discrete -	„	—	Unvaccinated		—	——	417
1004	2436	L. M. - -	F.	26	„ 7	—	—	—	Coherent -	„	—	Inf.	4	Mar. 23	——	462
1005	2437	W. H. - -	M.	29	„ 7	Apr. 2	Apr. 4	Apr. 9	Mild - -	„	—	Inf.	3 plain	—	——	563
1006	2438	E. J. - -	F.	18	„ 7	„ 3	„ 5	—	Mild - -	„	—	Inf.	4 scars	—	——	564
1007	2439	W. M. - -	M.	19	„ 7	„ 1	„ 3	Apr. 6	Mild - -	„	—	Inf.	3 foveate	—	——	536
1008	2440	F. L. - -	F.	8	„ 7	„ 5	„ 7	—	Mild - -	„	—	Inf.	4 foveate	—	——	415
1009	2441	B. C. - - -	F.	4	„ 7	„ 2	„ 4	—	Discrete -	„	—	Mar. 26	—	—	——	391
1010	2442	E. C. -	M.	5	„ 7	„ 5	„ 7	—	Mild - -	„	—	10 days before.	—	—	——	391
1011	2443	R. L. - -	M.	67	„ 7	„ 2	„ 4	—	Coherent -	„	—	Inf.	—	—	——	565

1012	2444	E. T.	M.	20	„ 7	„ 4	„ 6	—	Discrete	„	—	Inf.	—	—	—	565
1013	2446	F. A. P.	F.	5	„ 7	„ 3	„ 5	—	Confluent	D.	Apr. 19	Unvaccinated		—	Vaccinated; day of onset (Apr. 3).	220
1014	2447	J. E.	M.	17	„ 7	„ 5	„ 7	—	Discrete	Rec.	—	Unvaccinated		—	—	341
1015	2448	R. M.	F.	4	„ 7	„ 4	„ 7	—	Confluent	D.	Apr. 16	Unvaccinated		—	—	560
1016	2449	G. J.	M.	8	„ 7	„ 5	„ 6	Apr. 9	Confluent	D.	„ 16	Unvaccinated		—	—	566
1017	2450	H. L.	M.	27	„ 7	„ 5	„ 7	—	Discrete	Rec.	—	Inf.	—	—	—	565
1018	2451	C. W.	F.	28	„ 7	„ 4	„ 6	—	Malignant	D.	Apr. 6	Inf.	—	—	Recent parturition	567
1019	2452	— W.	M	2 days	„ 7	„ 6	„ 7	—	Malignant	D.	„ 6	Unvaccinated		—	No rash	567
1020	2453	A. W.	F.	4	„ 7	„ 3	„ 5	—	Confluent	Rec.	—	Unvaccinated		—	—	568
1021	2454	W. H.	M.	6	„ 7	„ 3	„ 5	Apr. 8	Confluent	D.	Apr. 26	Unvaccinated		—	Hæmorrhages into pustules	569
1022	2455	M. L.	F.	38	„ 7	—	—	—	Mild	Rec.	—	Inf.	—	—	—	570
1023	2458	W. H.	M.	30	„ 7	Apr. 5	Apr. 7	Apr. 8	Confluent	D.	Apr. 15	Inf.	2 faint	—	Hæmorrhages into pustules	499
1024	2536	J. B.	M.	51	„ 10	„ 9	„ 10	—	Confluent	D.	„ 20	Inf.	—	—	—	571
1025	2462	A. W.	M.	45	„ 7	Mar. 26	„ 1	—	Discrete	Rec.	—	Inf.	—	—	—	572
1026	2463	C. A.	M.	50	„ 7	Apr. 4	„ 6	—	Discrete	„	—	Inf.	—	—	—	573
1027	2464	J. C.	M.	15	„ 7	—	—	—	Mild	„	—	Inf.	—	—	—	574
1028	2466	A. B.	M.	39	„ 7	Apr. 5	Apr. 8	Apr. 8	Malignant	D.	Apr. 13	Unvaccinated		—	Not strong since influenza. Told his wife he had never been vaccinated.	575
1029	2467	A. W. C.	M.	48	„ 7	—	—	—	Mild	Rec.	—	Inf.	—	—	—	576
1030	2468	M. E.	F.	9	„ 7	Apr. 4	Apr. 6	Apr. 9	Coherent	„	—	Unvaccinated		—	—	577
1031	2469	G. C.	M.	24	„ 7	—	—	—	Mild	„	—	Inf.	—	—	Said to have had small-pox in infancy.	578
1032	2470	S. V.	F.	44	„ 7	Apr. 3	Apr. 6	—	Discrete	„	—	Inf.	—	—	—	476
1033	2471	M. S.	F.	23	„ 7	„ 3	„ 7	—	Mild	„	—	Inf.	—	—	—	579
1034	2472	J. S.	M.	49	„ 7	„ 6	„ 7	—	Mild	„	—	Inf.	Jan. 1896 Nil.	—	Eruption disappearing rapidly	580
1035	2473	C. P.	F.	48	„ 7	„ 6	„ 8	—	Confluent	„	—	Inf.	—	Jan. 1896. No result.	Large indurated papules	581
1036	2474	L. K.	F.	19	„ 7	—	—	—	Mild	„	—	Inf.	—	—	—	582
1037	2475	A. H.	M.	53	„ 8	Apr. 6	Apr. 8	—	Confluent	D.	Apr. 16	Inf.	—	—	—	583
1038	2476	J. W.	M.	32	„ 8	—	—	—	Confluent	Rec.	—	Inf.	—	—	—	584
1039	2477	J. P.	M.	14	„ 8	—	—	—	Mild	„	—	Inf.	—	—	—	584
1040	2478	G. E.	M.	65	„ 8	Apr. 6	Apr. 8	—	Confluent	D.	Ap. 18	Inf.	—	—	Hæmorrhage into pocks	585
1041	2479	W. W.	M.	35	„ 8	„ 5	„ 7	Apr. 8	Confluent	D.	„ 12	Aged 9 years.	2 plain	7 years ago, in army.	Hæmorrhage into pocks	586
1042	2480	E. W.	F.	26	„ 8	„ 2	„ 4	—	Coherent	Rec.	—	Unvaccinated		—	Does not think she had been vaccinated. There are no marks.	587
1043	2481	E. K.	F.	26	„ 8	„ 3	„ 5	—	Discrete	„	—	Inf.	—	—	—	588
1044	2482	A. C.	F.	53	„ 8	—	—	—	Confluent	„	—	Inf.	—	—	—	589
1045	2483	M. C.	F.	11	„ 8	—	—	—	Mild	„	—	Inf.	—	—	—	590
1046	2484	C. J.	F.	20	„ 8	Apr. 5	Apr. 7	—	Discrete	„	—	Inf.	—	—	—	591
1047	2485	C. S.	M.	18	„ 8	„ 3	„ 5	Apr. 9	Mild	„	—	Inf.	4 plain	—	—	592
1048	2486	L. P.	F.	39	„ 8	—	—	—	Confluent	D.	Apr. 16	Inf.	—	Mar. 21, 1896	—	593
1049	2487	E. J.	F.	17	„ 8	—	—	—	Mild	Rec.	—	Inf.	—	—	—	594
1050	2488	F. G.	F.	$\frac{10}{12}$	„ 8	Mar. 30	Apr. 2	—	Confluent	D.	Apr. 10	Unvaccinated		—	—	288
1051	2489	F. B.	M.	2	„ 8	Apr. 1	„ 3	Apr. 9	Confluent	D.	„ 13	Unvaccinated		—	—	595
1052	2491	E. G.	F.	28	„ 8	—	—	—	Confluent	D.	„ 13	Inf.	—	—	—	596
1053	2492	J. B.	M.	8	„ 8	Apr. 8	Apr. 10	Apr. 12	Mild	Rec.	—	Inf.	2 faint	—	—	420
1054	2493	L. R.	F.	20	„ 8	—	„ 2	—	Confluent	„	—	Inf.	4 large foveate.	—	A teacher at Tredworth Board School.	597
1055	2494	T. C.	M.	34	„ 8	—	—	—	Mild	„	—	Inf.	—	—	—	598

No.	Name and Notification Number.		Sex.	Age.	Date of				Type of Attack.	Result.	Date of Death.	Vaccination.		Re-vaccination Date.	Remarks.	No. in House Register.
					Notification.	Onset.	Rash.	Removal to Hospital.				Date.	No. of Marks.			
1.	2.		3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1056	2495	M. R.	F.	3	1896. Apr. 8	—	—	—	Confluent	Rec.	—	Unvaccinated		—	—	599
1057	2496	K. D.	F.	32	,, 8	Apr. 7	Apr. 9	—	Confluent	,,	—	Inf.	—	—	—	600
1058	2497	G. S.	M.	36	,, 8	,, 7	,, 9	Apr. 12	Malignant	D.	Apr. 16	Inf.	Not discernible.	—	—	601
1059	2498	W. C.	M.	4	,, 8	,, 3	,, 5	,, 12	Confluent	D.	,, 18	Unvaccinated		—	—	602
1060	2499	A. W.	F.	24	,, 8	,, 1	,, 3	—	Mild	Rec.	—	Inf.	—	—	—	603
1061	2500	T. B.	M.	27	,, 9	—	—	—	Mild	,,	—	Inf.	—	—	—	604
1062	2502	G. H. S.	M.	5	,, 9	Apr. 2	Apr. 4	—	Coherent	,,	—	Unvaccinated		—	—	605
1063	2503	A. G.	F.	8	,, 9	,, 7	,, 8	—	Confluent	,,	—	Unvaccinated		—	Said to have been 3 times vaccinated unsuccessfully.	606
1064	2504	H. S.	M.	44	,, 9	,, 31	,, 2	—	Coherent	,,	—	Inf.	—	Mar. 28	—	605
1065	2505	S. H.	F.	52	,, 9	,, 2	,, 5	—	Confluent	,,	—	Inf.	—	Mar 27 (3)	—	361
1066	2506	E. G.	M.	40	,, 9	,, 8	,, 9	—	Discrete	,,	—	Inf.	—	—	—	607
1067	2507	E. R.	F.	45	,, 9	—	—	—	Discrete	,,	—	Inf.	—	—	—	608
1068	2508	M. B.	F.	25	,, 9	Apr. 5	Apr. 7	Apr. 9	Confluent	,,	—	Inf.	3 faint	—	—	609
1069	2509	E. C.	F.	40	,, 9	,, 7	,, 9	—	Mild	,,	—	Inf.	—	—	—	412
1070	2510	E. P.	F.	36	,, 9	—	—	Apr. 12	Coherent	,,	—	Inf.	—	—	Eruption rapidly desiccated	610
1071	2511	T. C.	M.	22	,, 9	—	—	—	Conflnent	,,	—	Inf.	—	—	—	611
1072	—	T. C.	M.	48	—	—	—	—	Discrete	,,	—	Inf.	—	—	—	611
1073	2512	F. A. W.	M.	10	Apr. 9	Apr. 6	Apr. 8	—	Confluent	,,	—	Inf.	4 good	—	—	612
1074	2513	S. L.	F.	33	,, 9	—	—	—	Malignant	D.	Apr. 10	?	—	—	—	613
1075	2514	A. M.	M.	37	,, 9	Apr. 5	Apr. 7	—	Discrete	Rec.	—	Inf.	—	13 years ago	—	560
1076	2515	A. M.	F.	2	,, 9	,, 6	,, 8	—	Confluent	D.	Apr.	Unvaccinated		—	—	560
1077	2516	J. H.	M.	36	,, 9	,, 2	,, 4	—	Mild	Rec.	—	Inf.	—	Apr. 18 (2 places).	Not half-dozen "spots"; re-vaccination *after* attack.	614
1078	2517	M. E.	F	13	,, 9	,, 7	,, 9	—	Mild	,,	—	Inf.	—	Attempt failed	—	341
1079	2518	M. J.	F	37	,, 9	,, 7	,, 9	—	Confluent	,,	—	Inf.	—	—	—	369
1080	2870	P. J.	M.	14 days.	,, 21	—	—	—	Confluent	D.	Apr. 23	Unvaccinated		—	—	369
1081	2519	C. W.	M.	49	,, 9	—	—	—	Discrete	Rec.	—	Iuf.	—	—	—	615
1082	2520	W. M.	M.	34	,, 10	—	—	—	Discrete	,,	—	Inf.	—	—	—	617
1083	2521	H. D.	M.	18	,, 10	Apr. 7	Apr. 9	Apr. 11	Discrete	,,	—	Inf.	4 plain	Apr. 1 (2).	—	618
1084	2522	S. M.	M.	53	,, 10	,, 7	,, 9	,, 11	Malignant	D.	Apr. 12	Inf.	Not discernible.	—	—	619
1085	2523	J. H.	M.	20	,, 10	,, 4	,, 6	—	Confluent	D.	,, 22	Inf.	4 scars	—	—	620
1086	2524	A. S.	F.	19	,, 10	,, 8	,, 9	—	Mild	Rec.	—	Inf.	—	Apr. 7, no result.	—	580
1087	2525	C. R.	M.	26	,, 10	,, 8	,, 10	Apr. 13	Confluent	,,	—	Inf.	Not discernible.	—	—	621
1088	2526	W. H.	M.	42	,, 10	,, 6	,, 8	,, 11	Maliguant	D.	Apr. 14	Inf.	1 faint	—	—	622
1089	2527	P. K.	F	$\frac{5}{12}$	,, 10	Mar. 31	,, 2	—	Discrete	Rec.	—	Mar. 25	—	—	—	337
1090	2528	A. B.	M.	13	,, 10	Apr. 3	,, 4	—	Mild	,,	—	Inf.	—	Apr. 3 (1).	—	623
1091	2529	A. W.	M.	24	,, 10	—	—	—	Discrete	,,	—	Inf.	—	—	—	624
1092	2530	H. G.	M.	19	,, 10	Apr. 9	Apr. 10	—	Mild	,,	—	Iuf.	—	—	—	625

1093	2531	G. R. H.	F.	32	„ 10	„ 2	„ 7	—	Discrete	„	—	Inf.	—	—	—	626
1094	2532	A. M.	M.	1	„ 10	„ 8	„ 10	—	Discrete	„	—	Unvaccinated		—	—	64
1095	2533	E. M. L.	F.	15	„ 10	—	—	—	Mild	„	—	Inf.	—	Mar. 20	—	627
1096	2534	E. T.	F.	18	„ 10	—	—	Apr. 11	Coherent	„	—	Inf.	foveate	—	Eruption aborted	616
1097	2535	L. R.	M.	2	„ 10	—	—	—	Confluent	„	—	Unvaccinated		—	—	608
1098	2537	H. D.	F.	24	„ 10	Apr. 7	Apr. 9	Apr. 14	Mild	„	—	Inf.	4 plain	—	—	451
1099	2538	A. M. W.	F.	23	„ 10	—	—	—	Mild	„	—	Inf.	—	—	—	623
1100	2540	W. H.	M.	14	„ 10	Apr. 3	Apr. 5	—	Discrete	„	—	Inf.	3 good, 1 small.	Mar. 21	Infected through wall-paper of infected house.	629
1101	2541	G. P.	M.	43	„ 10	—	—	—	Discrete	„	—	Inf.	—	—	—	432
1102	2542	A. P.	F.	19	„ 10	Apr. 3	Apr. 5	Apr. 17	Coherent	„	—	Unvaccinated		—	Attempt at vaccination, 2 months ago; failed.	432
1103	2543	F. P.	M.	6	„ 10	„ 8	„ 10	—	Malignant	D.	Apr. 14	Unvaccinated		—	—	432
1104	2544	A. P.	M.	3	„ 10	„ 9	„ 11	Apr. 17	Confluent	Rec.	—	Unvaccinated		—	—	432
1105	2545	M. P.	F.	$\frac{6}{12}$	„ 10	„ 7	„ 9	—	Malignant	D.	Apr. 11	Unvaccinated		—	—	432
1106	2546	M. A. L.	F.	19	„ 10	„ 8	„ 10	—	Discrete	Rec.	—	Inf.	—	—	—	565
1107	—	A. L.	M.	15	—	„ 10	„ 11	—	Mild	„	—	Inf.	4 foveate	—	—	565
1108	2547	A. P.	F.	2	Apr. 10	„ 7	„ 9	—	Confluent	D.	Apr. 17	Unvaccinated		—	—	502
1109	2548	A. P.	M.	28	„ 10	„ 7	„ 9	—	Mild	Rec.	—	Inf.	—	18 years	Has 8 vaccination cicatrices	502
1110	2549	M. A. W.	F.	36	„ 10	Mar. 31	„ 2	Apr. 9	Confluent	„	—	Inf.	—	—	—	405
1111	2550	R. A.	M.	19	„ 10	—	—	—	Mild	„	—	Inf.	—	—	—	409
1112	2552	E. T.	F.	32	„ 10	Apr. 7	Apr. 9	—	Coherent	„	—	Inf.	—	Aged 14	—	630
1113	2553	A. P.	F.	60	„ 10	—	—	—	Mild	„	—	Inf.	—	—	—	631
1114	2554	E. R.	F.	4	„ 10	Apr. 6	Apr. 9	—	Confluent	„	—	Unvaccinated		—	—	632
1115	2556	A. W.	F.	19	„ 10	„ 5	„ 7	—	Mild	„	—	Inf.	—	—	—	485
1116	2557	E. W.	F.	4	„ 10	Mar. 29	Mar. 31	—	Confluent	„	—	Unvaccinated		—	—	485
1117	—	M. W.	F.	9	—	„ 17	„ 19	—	Coherent	„	—	Inf.	—	—	—	405
1118	2560	F. W.	F.	20	Apr. 10	Apr. 5	Apr. 8	—	Coherent	„	—	Inf.	—	—	—	633
1119	2561	E. D.	F.	15	„ 10	„ 3	„ 5	—	Discrete	„	—	Inf.	4 large	—	—	634
1120	2562	A. G.	F.	38	„ 10	Mar. 31	„ 3	—	Mild	„	—	Inf.	2 large	—	—	635
1121	2564	E. S.	F.	10	„ 10	—	—	—	Mild	„	—	Inf.	4 foveate	—	—	143
1122	2565	E. B.	F.	2	„ 10	—	—	—	Coherent	„	—	Unvaccinated		—	—	636
1123	2566	M. B.	F.	3	„ 10	Apr. 2	Apr. 5	—	Coherent	„	—	Unvaccinated		—	—	324
1124	2567	E. B.	F.	38	„ 11	„ 3	„ 9	—	Mild	„	—	Inf.	—	—	—	637
1125	2568	M. H.	F.	33	„ 11	—	—	—	Confluent	„	—	Inf. (alleged).	—	—	No vaccination cicatrices	638
1126	2569	A. M.	F	15	„ 11	Apr. 9	Apr. 11	Apr. 12	Discrete	„	—	Inf.	2 foveate	—	—	192
1127	2570	A. W.	M.	14	„ 11	—	—	—	Confluent	„	—	Inf.	3 faint	—	—	276
1128	2571	S. J.	F.	12	„ 11	Apr. 6	Apr. 8	—	Confluent	„	—	Inf.	4 faint	—	—	87
1129	2572	J. L.	M.	28	„ 11	„ 8	„ 10	Apr. 13	Malignant	D.	Apr. 16	Inf.	Not discernible.	—	—	639
1130	2573	H. H.	F.	3	„ 11	—	—	—	Confluent	D.	Apr. 17	Unvaccinated		—	—	250
1131	2574	H. G.	F.	55	„ 11	—	—	—	Mild	Rec.	—	Inf.	—	—	—	640
1132	2575	T. G.	M.	64	„ 11	—	—	—	Mild	„	—	Inf.	—	—	—	640
1133	2577	S. T.	M.	24	„ 11	Apr. 3	Apr. 5	—	Mild	„	—	Inf.	—	—	—	641
1134	2578	L. P.	M.	39	„ 11	„ 7	„ 9	—	Mild	„	—	Inf.	—	8 years ago	—	641
1135	2579	A. K.	F.	23	„ 11	„ 7	„ 8	—	Confluent	„	—	Unvaccinated		—	Hæmorrhage into pocks. Born at Cheltenham. Attempt at vaccination 7th April; no result.	642
1136	2580	S. R.	F.	24	„ 11	„ 8	„ 10	Apr. 13	Mild	„	—	Inf.	4 faint	—	—	643
1137	2582	E. L.	F.	53	„ 11	„ 8	„ 10	—	Malignant	D.	Apr. 11	Inf.	—	—	—	644
1138	2583	A. T.	F.	18	„ 11	„ 9	„ 11	Apr. 13	Malignant	D.	„ 14	Inf.	3 plain	—	Contracted at service in Lower Barton Street.	417
1139	2585	M. A. M.	F.	38	„ 11	„ 7	„ 10	—	Discrete	Rec.	—	Inf.	—	—	—	645

No.	Name and Notification Number.	Sex.	Age.	Date of				Type of Attack.	Result.	Date of Death.	Vaccination.		Re-vaccination Date.	Remarks.	No. in House Register.
				Notification.	Onset.	Rash.	Removal to Hospital.				Date.	No. of Marks.			
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1140	2586 N. M.	F.	11	1896. Apr. 11	Apr. 6	Apr. 8	Apr. 16	Mild	Rec.	—	Inf.	3 plain	—	—	646
1141	2587 M. W.	F.	66	„ 11	—	—	—	Mild	„	—	Inf.	—	33 years ago	—	647
1142	2588 F. K.	F.	2	„ 11	Apr. 6	Apr. 8	Apr. 13	Confluent	„	—	Unvaccinated		—	—	125
1143	2589 E. H.	F.	9	„ 11	„ 8	„ 9	—	Mild	„	—	Inf.	—	—	—	434
1144	2590 W. H.	M.	7	„ 11	„ 8	„ 9	—	Confluent	„	—	Inf.	4 large foveate.	—	Face "pitted"	434
1145	2591 H. P.	F.	46	„ 11	—	—	—	Mild	„	—	Inf.	—	—	—	410
1146	2593 G. S.	M.	41	„ 11	Apr. 7	Apr. 9	Apr. 15	Confluent	„	—	Inf.	1 plain	—	—	429
1147	2594 Mrs. H.	F.	65	„ 11	—	—	—	Mild	„	—	Inf.	—	—	—	648
1148	2595 A. C.	M.	26	„ 12	Apr. 10	Apr. 12	—	Mild	„	—	Inf.	—	—	—	437
1149	2597 Mrs. W.	F.	48	„ 12	—	—	—	Coherent	„	—	Unvaccinated		—	—	650
1150	2598 J. L.	F.	13	„ 12	Apr. 7	Apr. 9	—	Confluent	„	—	Inf.	2 small	—	Hæmorrhage into pocks	651
1151	2599 M. B.	F.	30	„ 12	„ 10	„ 12	Apr. 12	Malignant	D.	Apr. 15	Inf.	Not discernible.	—	Said to have had "small-pox years ago."	420
1152	2600 F. C.	F.	21	„ 12	„ 8	„ 11	—	Discrete	Rec.	—	Inf.	—	—	—	652
1153	2602 E. C.	F.	29	„ 12	„ 4	„ 7	Apr. 17	Confluent	„	—	Inf.	5 foveate	—	Desiccating	653
1154	2603 E. J.	F.	27	„ 12	—	—	—	Confluent	D.	Apr. 16	?	—	—	—	654
1155	2604 W. H.	M.	32	„ 12	—	—	—	Coherent	Rec.	—	Inf.	—	—	—	655
1156	2605 A. T.	F.	14	„ 12	Apr. 10	Apr. 12	Apr. 13	Malignant	D.	Apr. 14	Unvaccinated		—	Attempt at vaccination, April 6	656
1157	2606 W. M.	M.	24	„ 12	„ 8	„ 10	—	Discrete	Rec.	—	Inf.	—	—	—	657
1158	2607 W. J. E.	M.	36	„ 12	„ 9	„ 11	Apr. 17	Confluent	„	—	Inf.	Not discernible.	—	Hæmorrhage into pocks	658
1159	2608 S. B.	F.	4	„ 12	—	—	„ 13	Confluent	„	—	A few days	2 vesicles	—	Rapid subsidence of rash	420
1160	2609 R. B.	M.	57	„ 13	Apr. 11	Apr. 13	—	Coherent	„	—	Inf.	—	—	—	659
1161	2610 F. N.	F.	6	„ 13	„ 11	„ 13	Apr. 14	Confluent	„	—	Unvaccinated		—	—	140
1162	2611 M. S.	F.	4	„ 13	„ 10	„ 12	—	Confluent	„	—	Unvaccinated		—	—	660
1163	2612 W. S.	M.	28	„ 13	„ 8	„ 10	—	Confluent	D.	Apr. 16	Inf.	4 plain	Apr. 1. No result.	—	661
1164	2613 A. G.	F.	18	„ 13	„ 8	„ 11	—	Coherent	Rec.	—	Inf.	4	—	—	662
1165	2614 A. H.	M.	31	„ 13	„ 8	„ 10	—	Mild	„	—	Inf.	—	Apr. 2	—	663
1166	2615 Mrs. B.	.	72	„ 13	„ 8	„ 10	—	Mild	„	—	Inf.	—	Twice	—	664
1167	2616 E. C.	M.	33	„ 13	„ 10	„ 12	—	Coherent	„	—	Inf.	—	—	—	665
1168	2617 G. P.	M.	24	„ 13	„ 9	„ 12	—	Coherent	„	—	Inf.	—	—	—	666
1169	2618 R. R.	M.	$\frac{3}{12}$	„ 13	—	—	—	Confluent	D.	Apr. 18	Unvaccinated		—	—	181
1170	2620 A. P.	F.	43	„ 14	Apr. 12	Apr. 14	Apr. 14	Confluent	D.	„ 26	Inf. (alleged)	No marks	—	—	667
1171	2621 E M.	F.	5	„ 14	„ 6	„ 8	—	Confluent	Rec.	—	Unvaccinated		—	—	560
1172	2622 K. G.	F.	14	„ 14	„ 6	„ 10	—	Confluent	„	—	Inf.	4 smooth	—	Rash "aborted" without maturating.	668
1173	2623 C. G.	M.	9	„ 14	„ 11	„ 13	—	Coherent	„	—	Mar. 29	—	—	Rash copious, but aborting	400
1174	2624 E. G.	F.	13	„ 14	„ 11	„ 13	—	Confluent	„	—	Inf.	—	—	—	400
1175	2625 B. L.	F.	2	„ 14	—	—	—	Confluent	„	—	Unvaccinated		—	—	464
1176	— L. L.	F.	1	—	Apr. 12	Apr. 14	—	Confluent	„	—	Apr. 12*	—	—	*Day of onset	464
1177	2626 A. P.	M.	18	Apr. 14	„ 10	„ 12	Apr. 14	Confluent	„	—	Inf.	2 plain	—	—	670

1178	2627	Mrs. P.	F.	43	,, 14	—	—	—	Discrete	,,	—	Inf.	—	—	—	425
1179	2629	T. C.	M.	9	,, 14	—	—	—	Confluent	D.	Apr. 20	Unvaccinated		—	—	671
1180	2631	C. G.	M.	9	,, 14	Apr. 11	Apr. 13	Apr. 13	Confluent	Rec.	—	Unvaccinated		—	—	672
1181	2632	L. P.	F.	10	,, 14	—	—	—	Mild	,,	—	Unvaccinated		—	—	673
1182	2633	E. K.	F.	2	,, 14	—	—	—	Confluent	,,	—	Unvaccinated		—	—	674
1183	2634	J. J.	M.	20	,, 14	Apr. 9	Apr. 11	—	Confluent	,,	—	Apr. 8	—	—	—	675
1184	2635	W. A.	M.	1	,, 14	—	—	—	Discrete	,,	—	Unvaccinated		—	—	409
1185	2636	F. A.	F.	8	,, 14	—	—	—	Discrete	,,	—	Inf.	—	—	—	409
1186	2637	G. D.	M.	28	,, 14	Apr. 10	Apr. 12	Apr. 16	Discrete	,,	—	Inf.	4 plain	—	—	676
1187	2638	J. C.	M.	6	,, 14	,, 7	,, 9	,, 15	Confluent	,,	—	Unvaccinated		—	—	677
1188	2639	W. L.	M.	3	,, 14	,, 8	,, 10	,, 15	Confluent	D.	Apr. 19	Unvaccinated		—	—	678
1189	2640	C. V.	M.	7	,, 14	,, 9	,, 11	—	Confluent	Rec.	—	Unvaccinated		—	—	251
1190	2641	J. V.	M.	$\frac{6}{12}$	,, 14	,, 9	,, 11	—	Discrete	,,	—	Unvaccinated		—	—	251
1191	2643	H. H.	F.	5	,, 14	,, 10	,, 12	—	Confluent	,,	—	Apr. 9	—	—	—	679
1192	2644	M. M.	F.	35	,, 14	,, 11	,, 14	Apr. 16	Mild	,,	—	Inf.	2 faint	—	—	646
1193	2645	E. B.	F.	2	,, 14	,, 11	,, 13	,, 15	Coherent	,,	—	Unvaccinated		—	—	313
1194	2646	E. P.	F.	13	,, 14	,, 12	,, 14	,, 15	Confluent	,,	—	Inf.	4 foveate	—	—	427
1195	2647	C. P.	M.	4	,, 14	,, 13	,, 14	—	Mild	,,	—	Apr. 3	—	—	—	220
1196	2648	L. B.		2	,, 14	Mar. 19	Mar. 21	—	Mild	,,	—	Mar. 16	—	—	—	680
1197	2649	A. C.		33	,, 14	Apr. 11	Apr. 13	—	Confluent	,,	—	Inf.	5	—	Hæmorrhage into pocks	681
1198	2650	A. M.	M.	5	,, 14	,, 8	,, 10	—	Confluent	D.	Apr. 21	Unvaccinated		—	—	591
1199	2651	H. G.	M.	15	,, 14	,, 9	,, 11	Apr. 15	Discrete	Rec.	—	Inf.	2 plain, 1 faint.	—	—	682
1200	2652	W. G.	M.	35	,, 14	Mar. 27	Mar. 31	—	Mild	,,	—	Inf.	—	—	—	683
1201	2653	M. P.	F.	13	,, 14	—	—	—	Mild	,,	—	Inf.	4 foveate	—	—	684
1202	2654	F. S.	M.	12	,, 14	Apr. 12	Apr. 14	—	Mild	,,	—	Inf.	—	—	—	685
1203	2655	J. M.	M.	16	,, 14	,, 6	,, 8	Apr. 17	Mild	,,	—	Inf.	4 large	—	—	686
1204	2656	C. H.	F.	31	,, 14	,, 10	,, 12	,, 14	Confluent	D.	Apr. 22	Inf.	3 plain	—	Hæmorrhage into pocks	687
1205	2657	E. D.	F.	39	,, 14	,, 11	,, 14	—	Confluent	D.	,, 16	Inf.	—	Apr. 11	Abortion ; seven months	688
1206	2658	J. M.	M.	46	,, 14	,, 9	,, 11	Apr. 15	Discrete	Rec.	—	Aged 7	2 plain	—	—	689
1207	2659	H. S.	F.	26	,, 14	,, 12	,, 14	—	Coherent	,,	—	Inf.	2	—	—	690
1208	2660	R. L. J.	F.	25	,, 14	—	—	—	Discrete	,,	—	Inf.	—	—	—	691
1209	2661	A. H.	F.	14	,, 14	Apr. 14	Apr. 16	Apr. 18	Discrete	,,	—	Inf.	2 foveate	—	—	692
1210	2662	C. H.	M.	4	,, 14	,, 13	,, 15	,, 18	Confluent	,,	—	Unvaccinated		—	Hæmorrhage into pocks	692
1211	2663	E. A.	F.	22	,, 14	—	—	—	Mild	,,	—	Inf.	—	—	—	693
1212	2664	T. P.	F.	42	,, 14	Apr. 12	Apr. 14	Apr. 15	Confluent	,,	—	Inf.	4 good	—	Hæmorrhage into pocks; erythema on 11th day.	694
1213	2665	R. H.	F.	20	,, 14	,, 10	,, 14	—	Confluent	,,	—	Inf.	—	—	—	695
1214	2666	W. T.	M.	29	,, 14	,, 12	,, 14	—	Mild	,,	—	Inf.	—	—	—	102
1215	2667	D. M.	M.	44	,, 14	—	—	—	Confluent	,,	—	Inf.	—	Aged 14	—	696
1216	2669	J. H.	F.	35	,, 14	Apr. 8	Apr. 11	—	Discrete	,,	—	Inf.	—	—	"Small-pox" in infancy	697
1217	2670	E. J. H.	F.	23	,, 14	,, 12	,, 14	Apr. 15	Discrete	,,	—	Inf.	1 plain, 1 faint.	—	—	698
1218	2671	H. M.	M.	25	,, 14	,, 3	,, 5	,, 15	Confluent	,,	—	Inf.	4 plain	—	—	699
1219	2672	W. J.	F.	26	,, 14	,, 12	,, 14	,, 15	Malignant	D.	Apr. 17	Unvaccinated		—	Attempted vaccination, Apr. 8	700
1220	2673	R. P.	F.	61	,, 15	—	—	—	Mild	Rec	—	Inf.	—	—	—	701
1221	2674	W. W.	M.	50	,, 15	—	—	—	Confluent	D.	Apr. 16	Inf.	—	—	—	702
1222	2677	L. R.	F.	2	,, 15	Apr. 13	Apr. 15	—	Confluent	Rec.	—	Unvaccinated		—	—	632
1223	2678	E. P.	F.	8	,, 15	,, 12	,, 14	—	Confluent	D.	Apr. 25	Unvaccinated		—	—	527
1224	2679	W. H.	F.	$\frac{5}{12}$	,, 15	—	—	—	Confluent	D.	,, 20	Unvaccinated		—	—	633
1225	2680	S. C.	F.	52	,, 15	—	—	—	Discrete	Rec.	—	Inf.	—	—	—	703
1226	2681	R. M.	F.	15	,, 15	Apr. 11	Apr. 13	—	Malignant	D.	Apr.	Inf.	4	—	Mother's statement	444
1227	2682	E. M.	F.	12	,, 15	,, 13	,, 15	—	Mild	Rec.	—	Inf.	—	Attempt failed	—	444
1228	2683	J. A.	M.	36	,, 15	,, 12	,, 14	Apr. 17	Coherent	,,	—	Inf.	4 plain	—	—	704

No. 1.	Name and Notification Number. 2.		Sex. 3.	Age. 4.	Date of				Type of Attack. 9.	Result. 10.	Date of Death. 11.	Vaccination.		Re-vaccination Date. 14.	Remarks. 15.	No. in House Register. 16.
					Notification. 5.	Onset. 6.	Rash. 7.	Removal to Hospital. 8.				Date. 12.	No. of Marks. 13.			
1229	2685	E. S.	F.	40	1896. Apr. 15	Apr. 8	Apr. 10	—	Coherent	Rec.	—	Inf.	—	—	——	940
1230	2686	J. B.	M.	23	„ 15	„ 12	„ 14	—	Mild	„	—	Inf.	—	—	——	705
1231	2687	L. T.	F.	36	„ 15	„ 11	„ 13	Apr. 15	Confluent	D.	Apr. 20	Inf.	4 plain	—	Mother of No. 1556	706
1232	2688	A. S.	M.	6	„ 15	„ 13	„ 15	—	Confluent	D.	„ 28	Unvaccinated		—	Vaccinated Apr. 8, without result	940
1233	2689	W. S.	M.	37	„ 15	„ 11	„ 13	—	Coherent	Rec.	—	Inf.	—	—	——	295
1234	2690	E. C.	F.	30	„ 15	„ 13	„ 15	Apr. 17	Discrete	„	—	Inf.	3 plain	—	Large pustules	707
1235	2691	T. P.	M.	15	„ 15	„ 13	„ 15	„ 18	Confluent	„	—	Inf.	4 plain, scarred.	—	Hæmorrhage into vesicles	425
1236	2692	F. B.	F.	36	„ 15	—	—	—	Mild	„	—	Inf.	—	20 years ago	——	708
1237	2693	T. S.	M.	9	„ 15	—	—	—	Discrete	„	—	Unvaccinated		—	Attempted vaccination on Apr. 18; failed.	709
1238	2694	A. W.	M.	25	„ 15	—	—	—	Confluent	„	—	Inf.	—	—	——	710
1239	2695	E. P.	F.	26	„ 15	—	—	—	Discrete	„	—	Inf.	—	—	——	711
1240	2696	D. D.	F.	3	„ 15	Apr. 12	Apr. 14	—	Discrete	„	—	Unvaccinated		—	——	426
1241	2697	E. C.	F.	16	„ 15	„ 12	„ 14	Apr. 16	Confluent	„	—	Inf.	3 good	Apr. 8 (1 slight).	——	712
1242	2698	R. W.	F.	33	„ 15	„ 6	„ 8	—	Confluent	D.	Apr. 25	Inf.	—	—	——	713
1243	2699	J. G. E.	M.	43	„ 15	„ 11	„ 12	—	Mild	Rec.	—	Inf.	—	20 years ago	——	714
1244	2700	E. F.	M.	4	„ 15	„ 12	„ 14	Apr. 16	Confluent	„	—	Unvaccinated		—	——	715
1245	2701	M. B.	F.	27	„ 15	—	—	—	Mild	„	—	Inf.	6 good	—	——	716
1246	2702	E. V.	F.	15	„ 15	Apr. 11	Apr. 13	—	Confluent	„	—	Inf.	—	—	——	251
1247	2703	A. R.	M.	1	„ 15	„ 14	„ 16	Apr. 18	Confluent	D.	Apr. 22	Unvaccinated		—	——	125
1248	2704	R. J. B.	M.	37	„ 15	„ 4	„ 6	—	Confluent	Rec.	—	Inf.	3 faint	—	——	717
1249	2706	E. H.	F.	36	„ 15	—	—	—	Mild	„	—	Inf.	—	—	——	371
1250	2707	W. F.	M.	7	„ 15	Apr. 13	Apr. 15	Apr. 17	Confluent	D.	Apr. 23	Unvaccinated		—	——	715
1251	2708	M. A.	F.	18	„ 15	„ 13	„ 15	„ 19	Mild	Rec.	—	Inf.	4 plain	—	——	294
1252	2709	C. S.	M.	3	„ 15	„ 13	„ 15	„ 17	Confluent	„	—	Unvaccinated		—	——	429
1253	2710	C. W.	M.	49	„ 15	—	—	—	Mild	„	—	Inf.	—	—	——	276
1254	2711	J. R.	M.	26	„ 16	Apr. 13	Apr. 15	Apr. 15	Confluent	D.	Apr. 23	Apr. 14	—	—	Hæmorrhage into pustules. Vaccinated in infancy, but it "did not take."	608
1255	2712	H. D.	M.	5	„ 16	„ 15	„ 17	„ 18	Confluent	D.	„ 28	Unvaccinated		—	——	718
1256	2713	G. M.	M.	21	„ 16	„ 14	„ 16	„ 17	Mild	Rec.	—	Inf.	4 plain	—	——	719
1257	2714	F. O.	M.	19	„ 16	—	—	—	Coherent	„	—	Inf.	—	—	——	720
1258	2715	R. D.	F.	26	„ 16	—	—	—	Mild	„	—	Inf.	—	—	Parturition, Apr. 10	721
1259	2716	E. L.	F.	18	„ 16	—	—	—	Discrete	„	—	Inf.	—	—	——	722
1260	2717	E. T.	F.	2	„ 16	Apr. 14	Apr. 15	—	Confluent	„	—	Unvaccinated		—	——	443
1261	2864	T. C. T.	M.	1	„ 21	„ 19	„ 20	—	Confluent	D.	Apr. 28	Unvaccinated		—	——	443
1262	2718	W. S.	M.	8	„ 16	—	—	—	Confluent	Rec.	—	Unvaccinated		—	——	723
1263	2719	W. C.	M.	46	„ 16	Apr. 15	Apr. 16	—	Coherent	„	—	Inf.	—	—	——	652
1264	2720	N. L.	F.	32	„ 16	—	—	—	Mild	„	—	Inf.	—	—	——	724
1265	2721	E. G.	F.	35	„ 16	Apr. 13	Apr. 15	—	Discrete	„	—	Inf.	—	—	——	725
1266	2724	Mrs. P.	F.	73	„ 16	—	—	—	Mild	„	—	Inf.	—	"Often"	——	410
1267	2725	E. R. G.	F.	28	„ 16	Apr. 14	Apr. 14	—	Mild	„	—	Inf.	—	—	——	726

1268	2126	F. B.	M.	25	„ 16	„ 12	„ 14	Apr. 17	Confluent	D.	Apr. 24	Inf.	4 plain	—	Hæmorrhage into pustules. Broncho pneumonia.	727
1269	2727	L. A.	F.	2	„ 16	„ 13	„ 15	„ 18	Confluent	D.	„ 19	Unvaccinated		—	Hæmorrhage into pocks	407
1270	2728	O. A.	M.	5	„ 16	—	—	—	Discrete	Rec.	—	Unvaccinated		—	——	409
1271	2729	E. B.	F.	30	„ 16	Apr. 11	Apr. 13	—	Mild	„	—	Inf.	—	—	——	466
1272	2730	E. P.	F.	29	„ 16	„ 12	„ 15	—	Discrete	„	—	Inf.	—	—	——	728
1273	2732	E. S.	F.	56	„ 16	—	—	—	Discrete	„	—	Inf.	—	Apr. 5	——	479
1274	2733	A. S.	F.	43	„ 16	—	—	—	Coherent	„	—	Inf.	—	—	——	729
1275	2734	W. F.	M.	40	„ 17	Apr. 15	Apr. 17	Apr. 18	Confluent	D.	Apr. 19	Inf.	4 plain	Apr. 13	Hæmorrhage into pocks	730
1276	2735	H. H.	M.	2	„ 17	„ 15	„ 17	„ 18	Confluent	D.	„ 22	Unvaccinated		—	——	731
1277	2736	S. M.	F.	30	„ 17	„ 14	„ 16	„ 18	Coherent	Rec.	—	Inf.	3 plain	—	——	732
1278	2777	J. S.	M.	28	„ 17	—	—	—	Discrete	„	—	Inf.	3 plain	—	——	733
1279	2737	H. W.	M.	24	„ 17	Apr. 14	Apr. 16	—	Confluent	„	—	Inf.	4 good	—	——	734
1280	2739	M. A. S.	F.	7	„ 17	„ 14	„ 16	Apr. 18	Coherent	„	—	Unvaccinated		—	——	735
1281	2740	E. B.	F.	23	„ 17	—	—	—	Discrete	„	—	Inf.	—	—	——	736
1282	2741	J. V.	F.	29	„ 17	Apr. 5	Apr. 7	—	Mild	„	—	Inf.	—	—	——	737
1883	2742	A. S.	F.	30	„ 17	„ 14	„ 16	Apr. 18	Discrete	„	—	Inf.	3 plain	—	——	735
1234	2743	W. R. E.	M.	20	„ 17	„ 14	„ 16	„ 18	Confluent	„	—	Inf.	4 good	—	——	738
1285	2746	E. H.	F.	25	„ 17	„ 9	„ 11	—	Coherent	„	—	Inf.	—	—	——	400
1286	2747	F. W.	M.	3	„ 17	„ 14	„ 17	—	Confluent	D.	Apr. 23	Unvaccinated		—	——	739
1287	2748	M. H.	F.	5	„ 17	„ 14	„ 16	—	Confluent	D.	„ 22	Unvaccinated		—	——	434
1288	2749	K. H.	F.	8	„ 17	„ 14	„ 16	—	Malignant	D.	„ 18	Unvaccinated		—	——	434
1289	2750	H. W. L.	M.	13	„ 17	—	—	—	Mild	Rec.	—	Inf.	—	—		464
1290	—	E. L.	F.	10	—	Apr. 12	Apr. 14	—	Confluent	„	—	Apr. 12*	—	—	*Day of onset of small pox	464
1291	2751	A. A.	F.	4	Apr. 17	„ 15	„ 17	—	Confluent	D.	Apr. 24	Unvaccinated		—	——	518
1292	2752	E. P.	F.	23	„ 17	„ 8	„ 11	—	Confluent	Rec.	—	Unvaccinated		—	——	548
1293	2753	E. H.	F.	16	„ 17	„ 14	„ 16	Apr. 18	Discrete	„	—	Inf.	3 plain	—	——	740
1294	2754	P. P.	M.	14	„ 17	„ 11	„ 13	„ 18	Mild	„	—	Inf.	4 plain	—	——	427
1295	2755	E. R.	F.	35	„ 17	„ 5	„ 7	—	Mild	„	—	Inf.	2 scars	—	——	741
1296	2756	E. P.	M.	23	„ 17	—	—	—	Mild	„	—	Inf.	—	—	——	742
1297	2757	S. M.	F.	28	„ 17	Apr. 15	Apr. 17	Apr. 18	Mild	„	—	Inf. (alleged).	No marks	—	——	719
1298	—	M. M.	F.	1 day	—	—	—	„ 20	Indeterminate	D.	Apr. 21	Unvaccinated		—	Born in hospital with hæmorrhagic rash.	719
1299	2758	L. E. S.	M.	15	Apr. 17	Apr. 13	Apr. 15	„ 18	Coherent	Rec.	—	Inf.	4 small, plain.	Apr. 9 (1 mark).	——	743
1300	2759	R. L.	M.	$\frac{9}{12}$	„ 17	—	—	—	Confluent	D.	Apr. 28	Unvaccinated		—	——	744
1301	2761	C. D.	F.	15	„ 17	Apr. 15	Apr. 17	—	Mild	Rec.	—	Inf.	—	Apr. 4 (3)	——	538
1302	2762	M. A. S.	F.	32	„ 17	—	—	—	Confluent	„	—	Inf.	—	—	Confined day before onset	745
1303	2763	A. H.	F.	36	„ 18	Apr. 12	Apr. 14	Apr. 18	Discrete	„	—	Inf.	No marks	—	——	746
1304	2764	P. Y.	M.	2	„ 18	„ 9	„ 11	„ 20	Confluent	D.	Apr. 20	Unvaccinated		—	——	747
1305	2765	M. M.	F.	60	„ 18	„ 16	„ 18	„ 19	Mild	Rec.	—	Inf.	?	20 years ago and on Apr. 9 (4).	——	536
1306	2766	A. P.	F.	15	„ 18	„ 15	„ 17	„ 19	Mild	„	—	Inf.	4 plain	—	——	667
1307	2767	F. E. S.	F.	22	„ 18	„ 14	„ 16	—	Mild	„	—	Inf.	—	Apr. 13	——	748
1308	2768	M. E. B.	F.	32	„ 18	„ 17	„ 18	—	Malignant	D.	Apr. 23	Inf.	—	—	——	749
1309	2769	W. S.	M.	4	„ 18	„ 14	„ 16	Apr. 18	Mild	„	—	Unvaccinated		—	——	735
1310	2770	T. H. P.	M.	32	„ 18	„ 17	„ 18	—	Mild	„	—	Inf.	—	Apr. 5	——	547
1311	2771	S. A.	M.	14	„ 18	„ 14	„ 18	—	Discrete	„	—	Inf.	2 foveate	—	——	750
1312	2772	E. S.	F.	22	„ 18	„ 15	„ 17	Apr. 20	Discrete	„	—	Inf.	4 foveate	—	Rash rapid y fading	480
1313	2673	W G.	M.	17	„ 18	„ 13	„ 15	„ 18	Discrete	„	—	Inf.	4 faint	Apr. 10 (1)	——	751
1314	2774	V. S.	F.	6	„ 18	„ 11	„ 13	—	Coherent	„	—	Apr. 11	—	—	——	752
1315	2775	J. A.	M.	40	„ 18	Mar. 23	Mar. 25	—	Mild	„	—	Inf.	—	2 or 3 times without result.	——	407

No.	Name and Notification Number.	Sex.	Age.	Date of				Type of Attack.	Result.	Date of Death.	Vaccination		Re-vaccination Date.	Remarks.	No. in House Register.
				Notification.	Onset.	Rash.	Removal to Hospital.				Date.	No. of Marks.			
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1316	2776 F. M.	M.	16	Apr. 18	—	—	—	Mild	Rec.	—	Inf.	—	—	——	753
1317	2778 J. C.	M.	17	„ 18	—	—	—	Mild	„	—	Inf.	—	—	——	754
1318	2780 A. B.	M.	11	„ 18	Apr. 15	Apr. 17	Apr. 19	Discrete	„	—	Inf.	4 good	—	——	755
1319	2781 C. W.	M.	18	„ 18	„ 16	„ 17	—	Mild	„	—	Inf.	—	—	——	756
1320	2782 G. P.	F.	28	„ 18	„ 16	„ 18	—	Mild	„	—	Inf.	—	5 and 7 weeks before. No result.	——	404
1321	2783 J. C.	M.	26	„ 18	„ 15	„ 17	Apr. 19	Coherent	„	—	Inf.	2 plain	April 17. No result.	——	757
1322	2734 B. O.	M.	51	„ 18	—	—	—	Discrete	„	—	Unvaccinated		—	——	496
1323	2789 T. W.	M.	18	„ 19	Apr. 17	Apr. 19	—	Discrete	„	—	Inf.	—	—	——	758
1324	2790 A. J	M.	3	„ 19	„ 15	„ 17	—	Discrete	„	—	Apr. 11	2 vesicle	—	——	759
1325	2791 A. D.	F.	3	„ 19	„ 12	„ 14	Apr. 20	Discrete	„	—	„ 12	—	—	Rash peculiar, minute red papules and pustules.	451
1326	2792 J. W.	M.	35	„ 19	—	—	—	Mild	„	—	Inf.	—	—	——	405
1327	2793 T. E. B.	M.	2	„ 19	—	—	—	Coherent	„	—	Unvaccinated		—	——	760
1328	2794 F. R.	F.	1	„ 19	Apr. 15	Apr. 17	Apr. 19	Confluent	D.	Apr. 22	Unvaccinated		—	——	537
1329	2795 E. V.	F.	2	„ 19	„ 17	„ 19	—	Confluent	D.	„ 22	Unvaccinated		—	——	251
1330	2796 L. P.	F.	6 wks.	„ 19	„ 13	„ 15	—	Mild	Rec.	—	Apr. 6	—	—	——	557
1331	2797 A. (Inf.)	F.	10days	„ 19	—	—	—	Confluent	D.	Apr. 20	Unvaccinated		—	——	409
1332	2798 R. P.	M.	21	„ 19	Apr. 16	Apr. 18	Apr. 22	Confluent	Rec.	—	Inf.	4 plain	—	Hæmorrhage into pustules	425
1333	2799 W. C.	M.	6	„ 19	Mar. 28	„ 2	—	Mild	„	—	Unvaccinated		—	——	761
1334	2800 E. C.	F.	4	„ 19	Apr. 15	„ 17	—	Discrete	„	—	Unvaccinated		—	——	761
1335	2801 E. C.	F.	12	„ 19	„ 15	„ 17	—	Discrete	„	—	Inf.	3 foveate	—	——	761
1336	2802 J. E. H.	M.	19	„ 19	„ 15	„ 17	—	Confluent	„	—	Inf.	—	—	Multiple abscesses	762
1337	2803 W. S.	M.	1	„ 19	„ 16	„ 18	Apr. 20	Confluent	D.	Apr. 23	Apr. 14	—	—	——	763
1338	2804 A. W.	F.	20	„ 19	„ 14	„ 16	„ 19	Confluent	Rec.	—	„ 11	4 large	—	Did not "take" in infancy	764
1339	2805 C. W.	M.	45	„ 19	—	—	—	Confluent	„	—	Inf.	—	—	Engaged on hospital works	765
1340	2806 W. H.	M.	60	„ 19	Apr. 17	Apr. 19	Apr. 20	Malignant	D.	Apr. 22	Inf.	—	—	——	766
1341	2807 F. W.	M.	34	„ 19	„ 9	„ 12	—	Mild	Rec.	—	Inf.	—	—	——	767
1342	2808 J. M.	M.	60	„ 19	—	—	—	Confluent	D.	Apr. 23	Inf.	—	—	——	362
1343	2809 F. M.	M.	17	„ 19	Apr. 16	Apr. 18	Apr. 22	Confluent	Rec.	—	Inf.	4 plain	—	Hæmorrhage into pustules	768
1344	2810 G. M.	M.	19	„ 19	„ 16	„ 18	„ 22	Mild	„	—	Inf.	4 foveate	—	——	768
1345	2811 W. S.	M.	18	„ 19	—	—	—	Discrete	„	—	Inf.	3 foveate	—	——	769
1346	2812 F. J.	F.	41	„ 19	Apr. 16	Apr. 18	Apr. 20	Confluent	„	—	Inf.	3 foveate, 1 faint.	—	Hæmorrhage into pustules, "scarlatinal" rash on 11th day.	770
1347	2813 E. B.	F.	8	„ 19	—	—	—	Mild	„	—	Inf.	—	—	——	771
1348	2814 L. T.	F.	3	„ 19	Apr. 17	Apr. 19	—	Confluent	„	—	Unvaccinated		—	——	772
1349	2815 F. G.	M.	30	„ 19	—	—	—	Mild	„	—	Inf.	—	—	——	773
1350	2816 F. C. R.	M.	10	„ 19	Apr. 14	Apr. 16	—	Confluent	„	—	Unvaccinated		—	——	774
1351	2817 T. H. S.	M.	14	„ 19	„ 15	„ 17	—	Mild	„	—	Inf.	4 foveate	8 days before onset (2).	A first attempt at re-vaccination failed.	775
1352	2818 F. V.	F.	10	„ 19	„ 16	„ 18	Apr. 20	Mild	„	—	Inf.	2 faint	—	——	776
1353	2819 P. J.	M.	28	„ 19	„ 14	„ 16	—	Mild	„	—	Inf.	—	Apr. 7	——	777

1354	2820	E. H.	F.	4	„ 20	„ 15	„ 17	Apr. 18	Confluent	D.	Apr. 23	Unvaccinated		—	Hæmorrhage into pocks	778
1355	2821	E. B.	F.	36	„ 20	„ 18	„ 20	—	Coherent	Rec.	—	Inf.	—	—	—	779
1356	2822	A. J.	M.	4	„ 20	„ 17	„ 19	—	Discrete	„	—	Unvaccinated		—	Not pustular	780
1357	2823	M. O.	F.	36	„ 20	„ 17	„ 19	Apr. 20	Malignant	D.	Apr. 21	Inf.	Not discernible.	—	—	530
1358	2824	W. S.	M.	18	„ 20	„ 18	„ 20	—	Coherent	Rec.	—	Inf.	—	—	—	450
1359	2825	A. D.	F.	$\frac{1}{12}$	„ 20	—	—	—	Confluent	D.	Apr. 26	Unvaccinated		—	—	781
1360	2826	W. B.	M.	27	„ 20	Apr. 18	Apr. 20	—	Mild	Rec.	—	Inf.	—	—	—	944
1361	2827	E. R.	F.	27	„ 20	—	—	—	Mild	„	—	Inf.	—	—	—	783
1362	2828	E. R.	F.	28	„ 20	Apr. 17	Apr. 19	May 5	Confluent	„	—	Unvaccinated		—	Born at Bourton-on-Water. Hæmorrhage into pocks.	784
1363	2829	F. P.	M.	20	„ 20	—	—	—	Mild	„	—	Inf.	—	—	—	785
1364	2830	M. L.	F.	30	„ 20	Apr. 16	Apr. 18	Apr. 23	Confluent	„	—	Inf.	4 plain	Apr. 15 (1)	—	415
1365	2831	J. B.	F.	3	„ 20	—	—	—	Confluent	D.	Apr. 23	Unvaccinated		—	—	760
1366	2832	E. S.	M.	3	„ 20	Apr. 16	Apr. 18	—	Confluent	Rec.	—	Unvaccinated		—	—	786
1367	2833	E. P.	F.	$\frac{7}{12}$	„ 20	„ 17	„ 19	—	Mild	„	—	9 days before.	. .	—	—	338
1368	2834	F. P.	F.	24	„ 20	„ 17	„ 19	—	Mild	„	—	Inf.	—	—	—	338
1369	2835	E. P.	M.	18	„ 20	„ 15	„ 17	—	Mild	„	—	Inf.	—	—	Attempt at re-vaccination failed	342
1370	2836	C. O.	F.	32	„ 20	„ 18	„ 20	Apr. 23	Coherent	„	—	Inf.	3 plain	—	—	787
1371	2837	F. P.	M.	30	„ 20	„ 16	„ 18	„ 22	Mild	„	—	Inf.	—	Apr. 11	—	557
1372	2838	S. T.	F.	6	„ 20	„ 16	„ 18	—	Confluent	D.	Apr. 21	Unvaccinated		—	—	417
1373	2839	F. D.	F.	29	„ 20	„ 16	„ 18	Apr. 20	Mild	Rec.	—	Inf.	2 faint	—	—	788
1374	3339	N. M.	F.	8	May 30	May 11	May 13	—	Coherent	„	—	Unvaccinated		—	—	1005
1375	2841	H. J.	M.	2	Apr. 20	Apr. 16	Apr. 18	May 6	Confluent	„	—	Apr. 9	—	—	—	790
1376	2842	E. S.	F.	30	„ 20	„ 18	„ 20	—	Mild	„	—	Inf.	—	—	Attempt at re-vaccination on April 15, no result.	441
1377	2843	F. H.	F.	22	„ 20	„ 9	„ 13	—	Discrete	„	—	Inf.	—	—	—	614
1378	2845	H. F.	M.	25	„ 20	„ 17	„ 19	Apr. 23	Confluent	„	—	Inf.	2 plain	—	—	791
1379	2846	J. C.	M.	14	„ 20	„ 20	„ 20	—	Mild	„	—	Inf.	—	Apr. 15	—	712
1380	2847	A. G.	M.	29	„ 20	—	—	—	Mild	„	—	Inf.	—	—	Attempted re-vaccination one month previously, failed.	792
1381	2848	E. H.	F.	30	„ 20	—	—	—	Coherent	„	—	Inf.	—	—	—	793
1382	2849	R. R.	F.	45	„ 20	—	—	—	Discrete	„	—	Inf.	—	—	—	794
1383	2850	R. E.	M.	32	„ 20	—	—	—	Mild	„	—	Inf.	—	—	—	795
1384	2851	R. E.	M.	3	„ 20	—	—	—	Confluent	„	—	Unvaccinated		—	—	795
1385	2852	H. M.	M.	17	„ 21	—	—	—	Mild	„	—	Inf.	—	—	—	796
1386	2853	G. C.	M.	9	„ 21	Apr. 20	Apr. 22	Apr. 23	Coherent	„	—	Apr. 16	4 taking	—	—	513
1387	2854	M. P.	F.	16	„ 21	„ 16	„ 18	—	Mild	„	—	Inf.	2	—	—	797
1388	2855	S. B.	F.	45	„ 21	—	—	—	Mild	„	—	Inf.	2	—	—	798
1389	2856	E. S.	F.	26	„ 21	—	—	—	Confluent	D.	Apr. 25	Inf.	—	—	—	799
1390	2858	S. M.	M.	53	„ 21	Apr. 19	Apr. 21	Apr. 22	Discrete	Rec.	—	Inf.	3 plain	—	—	782
1391	2859	E. C.	F.	24	„ 21	„ 19	Apr. 21	„ 22	Mild	„	—	Inf.	4 foveate	—	2 or 3 pustules on face	800
1392	2860	M. P.	M.	25	„ 21	—	—	—	Mild	„	—	Inf.	—	—	—	801
1393	2861	G. E.	M.	9	„ 21	Apr. 17	Apr. 20	—	Coherent	„	—	Unvaccinated		—	—	519
1394	2862	P. E.	M.	6	„ 21	„ 18	„ 20	—	Confluent	D.	Apr. 25	Unvaccinated		—	—	519
1395	2863	H. B.	F.	42	„ 21	„ 19	„ 21	—	Coherent	Rec.	—	Inf.	—	—	—	802
1396	2865	W. S.	M.	33	„ 21	„ 18	„ 21	—	Mild	„	—	Inf.	1 faint	Apr. 10. 4 marks.	—	803
1397	2866	C. B.	M.	5	„ 21	—	—	—	Confluent	„	—	Unvaccinated		—	—	804
1398	2867	A. P.	M.	5	„ 21	Apr. 18	Apr. 20	—	Confluent	D.	Apr. 25	Unvaccinated		—	—	805
1399	2868	C. W.	F.	7	„ 21	„ 16	„ 18	—	Confluent	Rec.	—	About "10 days."	3 fair	—	—	586
1400	2869	M. T.	F.	14	„ 21	„ 16	„ 18	—	Discrete	„	—	Inf.	—	—	—	649

No.	Name and Notification Number	Sex.	Age.	Date of Notification.	Date of Onset.	Date of Rash.	Date of Removal to Hospital.	Type of Attack.	Result.	Date of Death.	Vaccination. Date.	Vaccination. No. of Marks.	Re-vaccination Date.	Remarks.	No. in House Register.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
				1896.											
1401	2871 P. P. - -	M.	4	Apr. 21	Apr. 16	Apr. 18	Apr. 23	Confluent -	Rec.	—	Unvaccinated		—	———	502
1402	2872 T. C - -	M.	25	,, 21	,, 15	,, 17	,, 24	Confluent -	D.	Apr. 27	Inf. (alleged).	No marks visible.	—	———	806
1403	2873 W. S. -	M.	23	,, 21	,, 18	,, 20	—	Mild - -	Rec.	—	Inf.	—	—	———	807
1404	2874 W. C. S. - -	M.	5	,, 22	,, 18	,, 21	—	Confluent -	,,	—	Unvaccinated		—	Attempt at vaccination (April 13), 5 days before onset, failed.	808
1405	2875 K. S. - - -	F	23	,, 22	,, 18	,, 21	—	Coherent -	,,	—	Inf.	3 faint	—	———	489
1406	2876 J. G. - -	M.	29	,, 22	—	—	—	Discrete -	,,	—	Inf.	—	—	———	809
1407	2877 E W. - - -	F.	63	,, 22	—	—	—	Mild - -	,,	—	Inf.	—	—	———	810
1408	2878 C. M. - -	M.	1	,, 22	Apr. 17	Apr. 19	Apr. 23	Confluent -	D.	Apr. 30	Unvaccinated		—	———	439
1409	2879 N. J. - - -	F.	7	,, 22	,, 20	,, 22	,, 23	Confluent -	Rec.	—	Unvaccinated		—	———	566
1410	2880 H. C. - -	M.	40	,, 22	,, 17	,, 19	,, 23	Discrete -	,,	—	Inf. (alleged).	No marks	—	———	811
1411	2881 M. A. Y. - -	F.	22	,, 22	,, 19	,, 20	—	Malignant -	D.	Apr. 22	Inf.	Apr. 11 (1).	—	Died shortly after giving birth to child (No. 1561).	812
1412	2882 R. J. - - -	M.	8 days	,, 22	—	—	—	Confluent -	D.	,, 24	Unvaccinated		—	———	654
1413	2883 S. M. - -	M.	5	,, 22	Apr. 20	Apr. 22	Apr. 25	Confluent -	Rec.	—	Unvaccinated		—	———	813
1414	2884 A. C. - - -	F.	9	,, 22	,, 19	,, 21	—	Discrete -	,,	—	Apr. 16	—	—	———	814
1415	2885 E. W. - -	M.	19	,, 22	,, 18	,, 20	—	Discrete -	,,	—	Inf.	—	Apr. 13	———	815
1416	2886 E. W. - - -	F.	4	,, 22	—	—	—	Confluent -	,,	—	Unvaccinated		—	———	56
1417	2887 A. P. - -	F.	28	,, 22	Apr. 15	Apr. 16	—	Discrete -	,,	—	Inf.	—	—	———	816
1418	2888 E. J. W. - -	F.	3	,, 22	,, 18	,, 20	Apr. 23	Confluent -	D.	Apr. 26	Unvaccinated		—	———	817
1419	2889 A. A. - - -	F.	14	,, 22	,, 17	,, 19	—	Mild - -	Rec.	—	Inf.	4 good	—	Attempt at re-vaccination on April 13 failed.	818
1420	2890 W. H. - -	M.	41	,, 22	,, 21	,, 23	Apr. 23	Malignant -	D.	Apr. 26	Inf.	—	—	———	692
1421	2891 W. G. - -	M.	45	,, 23	,, 21	,, 23	—	Mild - -	Rec.	—	Inf.	—	—	Inoculated on forehead by one of children.	498
1422	2892 E. B. - - -	F.	40	,, 23	,, 20	,, 22	Apr. 23	Discrete -	,,	—	Inf.	2 faint	Apr. 20 (1)	———	819
1423	2893 D. R. - -	F.	17	,, 23	,, 21	,, 23	,, 24	Discrete -	,,	—	Apr. 21	3 vesicles	—	Papules of various sizes - -	794
1424	2894 A. O. - - -	F.	42	,, 23	,, 21	,, 23	,, 24	Mild - -	,,	—	Inf.	3 faint	22 years ago (2).	———	820
1425	2895 W. O. - -	M.	22	,, 23	,, 21	,, 23	—	Mild -	,,	—	Inf.	—	Apr. 13 (4)	———	720
1426	2896 T. G. - - -	M.	33	,, 23	,, 19	,, 21	Apr. 24	Confluent -	,,	—	Apr. 15	4 good	—	Doubt as to infantile vaccination.	535
1427	2897 J. S. - -	M.	60	,, 23	,, 21	,, 23	,, 23	Mild - -	,,	—	Inf. (alleged).	No marks visible.	—	Attempt at re-vaccination 12 years ago failed.	821
1428	2898 W. P. - - -	M.	24	,, 23	,, 18	,, 20	—	Coherent -	,,	—	Inf.	—	—	———	548
1429	2899 A. C. - -	F.	45	,, 23	—	—	—	Coherent -	,,	—	Inf.	—	—	Attempt at re-vaccination, April 17, no result.	822
1430	2900 J. D. - - -	M.	24	,, 23	Apr. 16	Apr. 18	—	Mild - -	,,	—	Inf.	—	Apr. 16	———	721
1431	2901 M. L. - -	F.	6	,, 23	,, 20	,, 22	—	Discrete -	,,	—	Apr. 20	—	—	———	823
1432	2902 C. E. - - -	M.	4	,, 23	,, 21	,, 23	—	Coherent -	,,	—	Unvaccinated		—	———	519
1433	2904 G. A. P. - -	M.	2	,, 23	,, 21	,, 23	—	Confluent -	,,	—	Unvaccinated			———	554

1434	2906	A. W.	F.	24	„ 23	„ 20	„ 22	Apr. 24	Confluent	„	—	Inf.	2	—	—	739
1435	2907	E. E.	F.	64	„ 23	„ 16	„ 23	—	Mild	„	—	Inf.	—	—	—	585
1436	2908	K. K.	M.	16	„ 23	„ 18	„ 20	Apr. 24	Discrete	„	—	Inf.	3 faint	Apr. 17	—	468
1437	2909	L. C.	F.	65	„ 23	—	—	—	Discrete	„	—	Inf.	—	—	—	728
1438	2912	J. B.	M.	83	„ 24	Apr. 19	Apr. 22	—	Discrete	D.	Apr. 28	Inf.	—	—	Death from bronchitis	824
1439	2913	J. G.	M.	32	„ 24	„ 20	„ 21	—	Mild	Rec.	—	Inf.	—	—	—	506
1440	2914	T. G.	M.	39	„ 24	—	—	—	Mild	„	—	Inf.	—	—	Small-pox at 15 years of age	825
1441	2915	E. D.	F.	61	„ 24	Apr. 22	Apr. 24	—	Mild	„	—	Inf.	—	At 9 years old, and April 17.	—	826
1442	2917	G. B.	M.	25	„ 24	„ 19	„ 21	—	Mild	„	—	Inf.	—	—	—	855
1443	2918	J. C.	M.	25	„ 24	—	—	—	Mild	„	—	Inf.	—	Jan. 1, no result.	Arm was "bad" and poulticed	827
1444	2919	R. S.	F.	32	„ 24	—	—	—	Coherent	„	—	Inf.	—	—	—	828
1445	2920	L. M. H.	F	6	„ 24	—	—	—	Discrete	„	—	Unvaccinated		—	—	829
1446	2921	E. R.	M.	$\frac{3}{12}$	„ 24	Apr. 19	Apr. 21	—	Mild	„	—	Apr. 13	3 vesicles	—	Eruption—few scattered spots	632
1447	2922	S. L.	M.	37	„ 24	—	—	—	Confluent	D.	Apr. 29	Inf.	—	—	—	570
1448	—	J. L.	M.	11	—	Apr. 16	Apr. 18	—	Mild	Rec.	—	Inf.	—	Mar. 27	—	570
1449	2923	R. F.	M.	40	Apr. 24	„ 19	„ 21	Apr. 27	Discrete	„	—	Inf.	2 plain	7 days, no result.	—	830
1450	2924	M. G.	F.	28	„ 24	„ 19	„ 21	—	Discrete	„	—	Inf.	6 scars	Apr. 13	—	831
1451	2925	A. J. H.	F.	10wks.	„ 24	„ 19	„ 21	—	Discrete	„	—	Apr. 10	—	—	—	832
1452	2926	M. G.	F.	76	„ 24	„ 20	„ 22	Apr. 24	Discrete	„	—	Inf.	1 faint, 3 plain.	—	—	833
1453	2927	A. W.	F.	41	„ 24	„ 17	„ 19	—	Mild	„	—	Inf.	—	—	—	572
1454	3066	E. J. W.	M.	2 wks.	May 2	„ 28	„ 29	—	Confluent	D.	May 10	Unvaccinated		—	—	572
1455	2928	W. M.	M.	34	Apr. 24	„ 22	„ 24	—	Mild	Rec.	—	Inf.	—	—	—	257
1456	2929	A. S.	F.	18	„ 24	„ 17	„ 29	—	Mild	„	—	Inf.	—	6 weeks before, no result.	—	481
1457	2930	H. T.	M.	30	„ 24	„ 19	„ 21	Apr. 24	Discrete	„	—	Inf.	4 foveate	—	—	834
1458	2931	E. S.	M.	24	„ 24	„ 15	„ 23	—	Mild	„	—	Inf.	—	—	—	835
1459	2932	G. L.	M.	31	„ 24	„ 21	„ 22	—	Mild	„	—	Inf.	2 small	Feb., 2 insertions; no result.	—	836
1460	293	T. P.	M.	33	„ 24	„ 18	„ 20	—	Discrete	„	—	Inf.	—	Apr. 17 (1)	—	837
1461	2934	W. L.	M.	20	„ 24	„ 18	„ 20	Apr. 24	Mild	„	—	Inf.	4 plain	Apr. 20, no result.	—	838
1462	2935	C. W.	M.	10	„ 25	„ 23	„ 25	—	Mild	„	—	Inf.	4	—	—	839
1463	2936	A. A.	F.	45	„ 25	—	—	—	Confluent	D.	May 3	Inf.	—	—	—	573
1464	2937	W. B.	M.	28	„ 25	Apr. 22	Apr. 24	Apr. 26	Coherent	Rec.	—	Inf.	4 foveate	—	Delirium	609
1465	2238	W. R.	M.	1	„ 25	„ 24	„ 26	„ 27	Confluent	D.	Apr. 30	Apr. 16	2 vesicles	—	—	840
1466	2939	F. S.	F.	14	„ 25	—	—	—	Confluent	„	—	Unvaccinated		—	—	723
1467	2940	H. L.	F.	35	„ 25	—	—	—	Mild	„	—	Inf.	—	—	—	841
1468	2941	W. P.	M.	$\frac{11}{12}$	„ 25	Apr. 20	Apr. 22	—	Confluent	„	—	Unvaccinated		—	—	548
1469	2942	A. P.	F	16	„ 25	—	—	—	Discrete	„	—	Inf.	—	—	—	584
1470	2943	T. B.	M.	36	„ 25	Apr. 18	Apr. 20	—	Discrete	„	—	Inf.	—	—	—	842
1471	2944	L. W.	F	25	„ 25	„ 23	„ 25	—	Confluent	D.	May 5	Inf.	—	—	—	533
1472	2945	H. J. F.	M.	48	„ 25	„ 23	—	—	Malignant	D.	Apr. 25	Inf.	—	—	Death in prodromal stage from cardiac failure.	428
1473	2946	C. S.	M.	35	„ 25	„ 21	Apr. 23	Apr. 25	Discrete	Rec.	—	Inf.	1 faint	—	—	843
1474	2947	W. S.	M.	26	„ 25	„ 20	„ 22	„ 24	Confluent	„	—	Inf.	3 plain	—	Hæmorrhage into vesicles	844
1475	2948	E. M.	M.	41	„ 25	„ 19	„ 21	„ 27	Confluent	„	—	Inf. (alleged).	No marks visible.	—	Hæmorrhage into vesicles	753
1476	2949	G. R.	M.	$\frac{5}{12}$	„ 25	„ 19	„ 22	—	Confluent	D.	May 4	Unvaccinated		—	—	552

No.	Name and Notification Number.	Sex.	Age.	Date of Notification.	Date of Onset.	Date of Rash.	Date of Removal to Hospital.	Type of Attack.	Result.	Date of Death.	Vaccination. Date.	Vaccination. No. of Marks.	Re-vaccination Date.	Remarks.	No. in House Register.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1477	2950 E. E.	F	49	1896. Apr. 25	Apr. 23	Apr. 25	Apr. 26	Mild	Rec.	—	Inf.	—	—	—	577
1478	2951 F. H.	F	51	,, 25	,, 22	,, 23	,, 27	Confluent	,,	—	Inf.	4 plain	—	Rapid desiccation	684
1479	2953 F. J.	M.	4	,, 25	,, 23	,, 25	,, 27	Confluent	D.	May 3	Within 7 days of attack.	4	—	—	845
1480	2954 A. P.	F.	35	,, 25	,, 21	,, 24	—	Coherent	Rec.	—	Inf.	—	—	—	846
1481	2955 A. A.	F.	30	,, 25	,, 23	,, 25	Apr. 26	Mild	,,	—	Inf.	4 foveate	—	—	847
1482	2956 A. L.	M.	17	,, 25	,, 19	,, 23	—	Mild	,,	—	Inf.	3 faint	—	—	848
1483	2957 F. H.	M.	55	,, 26	,, 23	,, 25	Apr. 28	Confluent	,,	—	Aged 2	2 faint	—	—	849
1484	2958 T. E. R.	M.	4	,, 26	,, 22	,, 23	—	Confluent	D.	May 4	Apr. 17	2 vesicles	—	—	894
1485	2959 J. W.	M.	61	,, 26	,, 22	,, 24	Apr. 26	Confluent	D.	May 1	Unvaccinated		—	Hæmorrhage into vesicles	850
1486	2960 J. J.	M.	39	,, 26	—	—	—	Mild	Rec.	—	Inf.	—	—	—	851
1487	2962 H. H.	M.	25	,, 26	Apr. 23	Apr. 25	—	Discrete	,,	—	Inf.	—	April 4 (1)	—	852
1488	2963 W. H.	M.	32	,, 26	,, 21	,, 23	—	Discrete	,,	—	Inf.	1 foveate	—	—	626
1439	2964 F. D.	F.	17days	,, 26	—	—	—	Confluent	D.	Apr. 28	Unvaccinated		—	—	721
1490	2966 M. B.	F.	29	,, 27	Apr. 23	Apr. 26	—	Mild	Rec.	—	Inf.	—	—	—	853
1491	2967 T. J.	M.	15	,, 27	,, 20	,, 21	—	Mild	,,	—	Inf.	4 smooth	—	Xeroderma	566
1492	2968 G. E. W.	M.	6	,, 27	,, 23	,, 24	—	Confluent	D.	May 4	Unvaccinated		—	—	678
1493	2969 L. N.	F.	2	,, 27	,, 26	,, 28	Apr. 29	Confluent	Rec.	—	Unvaccinated		—	—	854
1494	2970 E. M. C.	F.	8	,, 27	,, 23	,, 25	—	Coherent	,,	—	Apr. 18	2 vesicles	—	Full large pustules on hands	761
1495	2971 J. B.	M.	21	,, 27	,, 22	,, 24	—	Confluent	,,	—	Inf.	2	April 17 (1)	—	855
1496	2972 A. W.	F.	4	,, 27	,, 21	,, 25	—	Confluent	,,	—	Unvaccinated		—	—	857
1497	2973 C. McK.	M.	7	,, 27	,, 21	,, 23	Apr. 27	Confluent	,,	—	Unvaccinated		—	—	856
1498	2974 W. T.	M.	1	,, 27	,, 24	,, 26	—	Coherent	,,	—	Unvaccinated		—	—	338
1499	2975 E. P.	F.	42	,, 27	,, 21	,, 23	—	Mild	,,	—	Inf.	—	April 15	—	673
1500	2976 F. R.	F.	23	,, 27	,, 19	,, 21	—	Discrete	,,	—	Unvaccinated		—	Fully formed large pustules with areolæ on face and arms. Three attempts at vaccination in infancy failed.	632
1501	2977 G. R.	M.	7	,, 27	,, 22	,, 24	—	Coherent	,,	—	Apr. 13	3 large vesicles.	—	Fully formed pustules on face; considerable aggregation round vaccine vesicles.	632
1502	2978 D. T.	M.	44	,, 27	,, 25	,, 27	—	Discrete	,,	—	Inf.	—	Apr. 18 (1)	—	858
1503	2979 A. A. B.	F.	9	,, 27	,, 24	,, 27	Apr. 28	Confluent	,,	—	Unvaccinated		—	—	859
1504	2980 G. P.	M.	20	,, 27	,, 25	,, 27	,, 28	Mild	,,	—	Inf.	3 faint	—	—	860
1505	2981 S. A. P.	F.	29	,, 27	,, 24	,, 26	—	Mild	,,	—	Inf.	3 ,,	—	—	861
1506	2982 M. W.	F.	14	,, 27	,, 24	,, 26	—	Discrete	,,	—	Inf.	4 ,,	—	—	739
1507	2983 A. W.	M.	2	,, 27	,, 24	,, 26	—	Confluent	,,	—	Unvaccinated		—	—	739
1508	2984 F. M.	M.	24	,, 27	,, 23	,, 27	—	Discrete	,,	—	Inf.	—	—	—	862
1509	2985 F. N.	F.	7	,, 27	,, 25	,, 27	Apr. 28	Coherent	,,	—	Unvaccinated		—	Pustules of various sizes	854
1510	2986 K. H.	F.	4	,, 27	,, 19	,, 23	—	Coherent	,,	—	Unvaccinated		—	Numerous small pustules	863
1511	2987 A. L.	M.	5	,, 27	,, 21	,, 24	—	Confluent	,,	—	Unvaccinated		—	—	678
1512	2988 E. W.	F.	15	,, 27	,, 22	,, 24	—	Mild	,,	—	Inf.	4 large	—	—	678
1513	2989 L. M.	F.	7	,, 27	—	—	—	Confluent	,,	—	Unvaccinated		—	—	560

1514	2990	A. M. - -	F.	$\frac{6}{12}$	" 27	—	—	—	Confluent -	D.	Apr. 27	Unvaccinated		—	—	560
1515	2991	F. F. - -	F.	3	" 27	Apr. 24	Apr. 26	—	Confluent -	Rec.	—	Unvaccinated		—	—	400
1516	2992	B. F. - -	F.	4	" 27	" 24	" 26	—	Confluent -	"	—	Unvaccinated		—	—	400
1517	2993	L. G. - -	F.	17	" 27	" 24	" 26	—	Mild - -	"	—	Inf.	3 large	—	—	400
1518	2995	B. G. - -	M.	8	" 28	" 21	" 23	—	Discrete -	"	—	Unvaccinated		—	—	498
1519	2996	E. B. - -	F.	26	" 28	" 22	" 24	Apr. 29	Discrete -	"	—	Inf.	2 foveate	—	—	313
1520	2997	C. W. - -	F.	30	" 28	" 23	" 25	" 29	Mild - -	"	—	Inf.	—	—	—	817
1521	2998	G. W. - -	M.	7	" 28	" 25	28	" 29	Malignant -	D.	May 1	Apr. 22	3 vesicles	—	Profuse hæmaturia; extensive purpura hermorrhagica on abdomen and legs.	817
1522	2999	E. W. - -	F.	8	" 28	" 26	" 28	—	Confluent -	Rec.	—	Unvaccinated		—	—	612
1523	3000	A. W. - -	M.	12	" 28	" 26	" 28	—	Confluent -	"	—	Unvaccinated		—	—	612
1524	3002	E. B. - -	M.	34	" 28	" 23	" 25	—	Discrete -	"	—	Inf.	—	—	—	420
1525	3003	E. M. - -	F.	17	" 28	" 24	" 26	Apr. 29	Coherent -	"	—	Unvaccinated		—	—	192
1526	3004	L. L. - -	F.	16	" 28	" 24	" 26	—	Discrete -	"	—	Inf.	4	Mar. 14 & 21 (1 imperfect scar).	Papules minute - - -	864
1527	3005	A. R. - -		7	" 28	" 23	" 24	—	Coherent -	"	—	Aged 1 yr.	No marks visible.	—	Said to have had four insertions	865
1528	3006	H. R. - -	M.	4	" 28	" 22	" 23	—	Confluent -	"	—	Unvaccinated		—	—	865
1529	3007	E. P. - -	F.	34	" 28	—	—	—	Mild - -	"	—	Inf.	—	—	—	867
1530	3008	J. T. - -	M.	30	" 28	Apr. 26	Apr. 28	—	Coherent -	"	—	Unvaccinated		—	Bears no evidence of having been vaccinated. Remembers his parents saying he was not. Native of Chorlton Kings, Cheltenham.	630
1531	3009	L. W. - - -	F.	52	" 28	" 25	" 29	Apr. 29	Coherent -	"	—	Inf.	1 faint	—	—	702
1532	3010	F. E. - -	M.	18	" 28	" 23	" 28	—	Discrete -	"	—	Inf.	—	—	—	866
1533	3011	R. S. - - -	F.	19	" 28	" 26	" 28	—	Confluent -	"	—	Inf.	4 smooth	—	—	671
1534	3012	F. P. - -	F.	26	" 29	" 24	" 26	—	Malignant -	D.	Apr. 29	Inf.	—	—	Confined of stillborn child two days before death.	554
1535	3013	V. F. - - -	M.	9	" 29	" 25	" 27	—	Confluent -	D.	May 6	Unvaccinated		—	—	868
1536	3014	G. C. - -	F.	10	" 29	" 21	" 24	—	Mild - -	Rec.	—	Apr. 13	3 vesicles	—	—	869
1537	3015	M. A. B. - -	F.	38	" 29	" 24	" 26	—	Mild - -	"	—	Inf.	—	—	—	870
1538	3016	S. A. H. - -	F.	11	" 29	" 24	" 27	—	Discrete -	"	—	Inf.	4 foveate	—	—	687
1539	3017	A. M. - -	M.	20	" 29	" 27	" 29	Apr. 29	Discrete -	"	—	Inf.	3 plain, 1 foveate.	Apr. 21 (3)	—	192
1540	3018	T. T. - -	M.	32	" 29	" 25	" 28	—	Confluent -	"	—	Inf.	—	Apr. 17, no result.	—	357
1541	3019	E. C. - - -	F.	56	" 29	—	—	—	Mild - -	"	—	Inf.	—	—	—	574
1542	3020	W. B. - -	M.	5	" 29	Apr. 26	Apr. 29	Apr. 30	Confluent -	D.	May 4	Unvaccinated		—	With hæmorrhages - -	871
1543	3021	E. P. - - -	F.	23	" 29	" 25	" 27	—	Mild - -	Rec.	—	Inf.	—	—	—	666
1544	3022	E. H. - -	M.	5	" 29	" 22	" 24	Apr. 30	Confluent -	D.	May 3	Unvaccinated		—	—	872
1545	3023	W. M. - -	M.	32	" 30	" 28	" 28	—	Mild - -	Rec.	—	Inf.	—	—	—	873
1546	3024	Mrs. G. - -	F.	56	" 30	" 25	" 27	—	Coherent -	"	—	Inf.	—	—	—	874
1547	3025	G. H. - -	F.	3 weeks.	" 30	" 28	" 30	—	Confluent -	D.	May 7	Unvaccinated		—	Rash gradually evolved - -	875
1548	3026	E. J. H. - -	M.	7	" 30	" 29	May 1	May 2	Coherent -	Rec.	—	Unvaccinated		—	—	863
1549	3027	E. W. - -	F.	62	" 30	" 26	Apr. 30	—	Discrete -	"	—	Inf.	—	—	—	876
1550	3028	W. P. - -	M.	24	" 30	" 24	" 26	May 2	Discrete -	"	—	Inf.	1 plain 2 faint.	Apr. 20 (3)	—	877
1551	3029	G. S. - -	M.	32	" 30	" 28	" 30	—	Mild - -	"	—	Inf.	—	—	—	752
1552	3030	H. S. - -	M.	18	" 30	—	—	—	Discrete -	"	—	Inf.	—	—	—	722
1553	3031	B. L. - - -	F.	3	" 30	—	—	—	Mild -	"	—	Unvaccinated		—	—	722

No.	Name and Notification Number.	Sex.	Age.	Date of Notification.	Date of Onset.	Date of Rash.	Date of Removal to Hospital.	Type of Attack.	Result.	Date of Death.	Vaccination. Date.	Vaccination. No. of Marks.	Re-vaccination Date.	Remarks.	No. in House Register.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1554	3032 J. G.	M.	17	1896. April 30	April 25	April 27	—	Mild	Rec.	—	Inf.	4 scars (2 foveate).	At 10 and April 27	—	878
1555	3033 C. W.	F.	6	,, 30	,, 26	,, 29	—	Confluent	,,	—	Unvaccinated		—	—	107
1556	3034 V. M. T.	F.	$\frac{4}{12}$	,, 30	,, 28	,, 30	May 1	Malignant	D.	May 4	Unvaccinated		—	Child of No. 1231. Taken to House 96 on death of mother. Flat papules and purpuric patches over face and limbs.	706
1557	3035 E. W.	M.	32	,, 30	,, 28	,, 30	,, 2	Confluent	Rec.	—	Inf.	Marks?	—	Hæmorrhage	879
1558	3037 A. H.	M.	4	,, 30	,, 28	,, 30	,, 2	Confluent	D.	May 7	Unvaccinated		—	—	880
1559	3038 E. W.	F.	40	,, 30	,, 28	,, 30	—	Confluent	Rec.	—	Inf.	—	—	—	857
1560	3040 A. K.	M.	1	,, 30	,, 26	,, 26	—	Discrete	,,	—	Unvaccinated		—	—	674
1561	3041 —. Y.	M.	8 days	,, 30	—	,, 28	—	Confluent	D.	May 3	Unvaccinated		—	Born April 22	812
1562	3043 F. P.	M.	4	,, 30	April 28	,, 30	May 1	Coherent	Rec.	—	Unvaccinated		—	Pustules on face of various sizes	881
1563	3044 A. Y.	F.	21	,, 30	,, 25	,, 27	April 30	Mild	,,	—	Inf.	4 foveate	At 10. No result.	—	882
1564	3045 W. H.	M.	47	,, 30	,, 25	,, 27	—	Mild	,,	—	Inf.	—	—	—	883
1565	3046 T. F.	M.	23	,, 30	,, 27	,, 28	—	Discrete	,,	—	Inf.	2 scars	—	—	884
1566	3047 F. M.	M.	5	May 1	—	—	—	Confluent	D.	May 8	Unvaccinated		—	—	510
1567	3048 E. G.	F.	51	,, 1	April 27	April 29	—	Discrete	Rec.	—	Inf.	—	—	—	885
1568	3049 W. T.	M.	32	,, 1	,, 28	,, 30	—	Coherent	,,	—	Inf.	—	—	—	886
1569	3050 J. R.	M.	20	,, 1	,, 25	,, 29	—	Discrete	,,	—	Inf.	4 scars	—	—	887
1570	3051 D. H.	F.	3	,, 1	,, 29	,, 30	—	Discrete	,,	—	Unvaccinated		—	—	888
1571	3053 J. B.	M.	35	,, 1	,, 29	May 1	—	Confluent	,,	—	Inf.	—	—	—	889
1572	3054 E. R.	F.	31	,, 1	,, 28	April 29	—	Confluent	,,	—	Inf.	—	April 25. No result.	—	890
1573	3055 E. D.	F.	56	,, 1	,, 27	,, 30	May 1	Coherent	,,	—	Inf.	2 faint	—	Said to have had small-pox in childhood. Pustules multiform.	891
1574	3056 E. A.	F.	46	,, 1	,, 27	,, 29	—	Discrete	,,	—	Inf.	—	—	—	892
1575	3057 W. T.	M.	19	,, 1	,, 21	,, 24	—	Discrete	,,	—	Inf.	3 foveate	—	—	893
1576	3059 E. F.	M.	22	,, 2	,, 30	May 2	—	Mild	,,	—	Inf.	—	3 weeks	—	894
1577	3060 C. G.	M.	70	,, 2	,, 26	,, 1	May 3	Mild	,,	—	At 10	2 faint, 2 plain.	—	—	645
1578	3061 P. V.	M.	55	,, 2	,, 29	,, 1	,, 2	Coherent	,,	—	At 4	2 plain	April 25 (4)	—	776
1579	3062 B. S.	F.	17days	,, 2	—	—	—	Malignant	D.	May 2	Unvaccinated		—	—	745
1580	3063 E. G.	F.	34	,, 2	April 26	April 30	May 1	Discrete	Rec.	—	Inf.	1 foveate	—	Confined April 6	672
1581	3064 M. H.	F.	13	,, 2	,, 27	,, 29	—	Coherent	,,	—	Inf.	4 foveate	—	—	466
1582	3097 W. H.	M.	6	,, 5	,, 27	May 3	—	Confluent	,,	—	Unvaccinated		—	Vaccinated in 4 places on April 30 without result.	466
1583	3065 A. P.	M.	5	,, 2	,, 25	April 26	—	Discrete	,,	—	Unvaccinated		—	—	895
1584	3067 F. W.	M.	8	,, 2	,, 28	May 1	—	Discrete	,,	—	Inf.	1 foveate scar about ½-in.	—	—	107

1585	3068	C. H.	F.	3	„ 2	„ 27	April 30	—	Confluent	„	—	April 24	—	—	Attempted vaccination on April 10 failed.	900
1586	3070	J. M.	F.	3	„ 2	„ 28	„ 30	—	Confluent	D.	May 7	April 27	3 meagre marks.	—	—	862
1587	3071	H. P.	F.	2	„ 2	„ 28	„ 30	—	Confluent	Rec.	—	April 22	Slight scar	—	—	527
1588	3072	E. R.	M.	43	„ 2	„ 28	„ 30	May 3	Coherent	„	—	Inf.	3 plain	April 13. No result.	—	741
1589	3073	M. D.	F.	6	„ 2	„ 26	May 1	—	Confluent	„	—	Unvaccinated		—	—	634
1590	3074	H. M.	F.	55	„ 3	„ 27	April 29	—	Mild	„	—	Inf.	—	—	—	686
1591	3075	M. A. G.	F.	43	„ 3	„ 30	May 2	—	Discrete	„	—	Inf.	—	—	—	896
1592	3076	J. K.	M.	66	„ 3	May 1	„ 3	May 3	Confluent	D.	May 8	Aged 4	—	—	—	897
1593	3077	E. P.	F.	61	„ 4	April 30	„ 3	—	Confluent	D.	„ 13	Inf.	—	—	—	898
1594	3078	E. B.	M.	38	„ 4	May 1	„ 1	—	Coherent	Rec.	—	Inf.	—	April 25. No result.	—	899
1595	3079	S. H.	F.	23	„ 4	April 26	April 28	—	Mild	„	—	Inf.	—	April 20. No result.	—	762
1596	3080	J. W.	M.	23	„ 4	„ 30	May 3	—	Discrete	„	—	Inf.	3 scarred	April 23 (2 insertions, 1 taking slightly).	—	902
1597	3081	H. C.	M.	18	„ 4	„ 30	„ 2	May 3	Confluent	„	—	Unvaccinated		—	—	903
1598	3082	S. C.	M.	3	„ 4	May 1	„ 4	—	Confluent	„	—	Unvaccinated		—	—	904
1599	3083	W. G.	M.	15	„ 4	April 29	„ 1	May 3	Discrete	„	—	Inf.	4 plain	April 20 & 29; failed.	—	905
1600	3084	E. F. T.	F.	8	„ 4	„ 29	„ 1	—	Confluent	D.	May 10	Unvaccinated		—	—	906
1601	3085	H. L.	F.	36	„ 4	„ 25	April 25	—	Mild	Rec.	—	Inf.	—	—	Inoculated on lip, by infant	744
1602	3086	F. W.	F.	23	„ 4	May 4	May 4	—	Mild	„	—	Inf.	—	—	—	907
1603	3387	A. V.	F.	15	„ 5	„ 1	„ 3	—	Mild	„	—	Inf.	—	April 28 (1)	—	908
1604	3088	J. B.	M.	27	„ 5	„ 2	„ 4	—	Discrete	„	—	Inf.	—	—	—	909
1605	3089	F. P.		14	„ 5	„ 1	„ 3	May 6	Mild	„	—	Inf.	4	—	—	805
1606	—	M. M.		4	„ 30	„ 25	„ 26	—	Coherent	„	—	Unvaccinated		—	—	1005
1607	3091	W. W.	M.	8	„ 5	April 28	April 30	—	Confluent	„	—	Inf.	2 faint	—	—	276
1608	3092	J. Y.	M.	16	„ 5	„ 28	„ 30	—	Discrete	„	—	Inf.	2 foveate	—	—	910
1609	3093	W. M.	M.	52	„ 5	„ 26	„ 28	—	Mild	„	—	Inf.	—	April 23 (3)	—	911
1610	3094	A. H.	F.	32	„ 5	„ 26	„ 29	—	Discrete	„	—	Inf.	—	—	—	633
1611	3095	E. G.	F.	5	„ 5	„ 28	„ 30	—	Discrete	„	—	April 24	3 vesicles	—	—	725
1612	3096	H. A.	F.	41	„ 5	May 1	May 3	—	Mild	„	—	Inf.	—	—	—	704
1613	3098	H. P.	M.	4	„ 5	„ 1	„ 3	—	Confluent	D.	May 7	Unvaccinated		—	Hæmorrhage into pocks	895
1614	3099	A. H.	M.	23	„ 5	3	„ 5	—	Mild	Rec.	—	Inf.	2 foveate	—	—	913
1615	—	A. P.	M.	25	—	„ 3	„ 5	May 5	Confluent	„	—	Inf.	4 plain	—	—	914
1616	3103	J. G. W.	M.	21	May 6	April 30	„ 2	—	Discrete	„	—	Inf.	3 foveate	Twice. No result	—	734
1617	3104	A. K.	F.	24	„ 6	May 3	„ 5	May 6	Confluent	„	—	Inf.	—	—	—	915
1618	3105	M. C.	F.	30	„ 6	April 24	April 26	—	Mild	„	—	Inf.	—	—	—	665
1619	3106	C. C.	F.	5	„ 6	„ 30	May 3	—	Confluent	„	—	Unvaccinated		—	Pustules full. Face ædematous	916
1620	3107	G. E.	M.	25	„ 6	May 1	„ 3	—	Confluent	„	—	Inf.	—	April 27. No result.	—	917
1621	3108	E. J.	F.	31	„ 6	„ 3	„ 5	May 6	Malignant	D.	May 10	Inf.	1 faint	—	—	790
1622	3109	H. B.	M.	17	„ 6	„ 3	„ 6	—	Confluent	Rec.	—	Inf.	4 plain	—	—	918
1623	3110	S. Y.	F.	53	„ 6	„ 1	„ 5	—	Mild	„	—	Inf.	—	—	—	919
1624	3111	A. F.	F.	39	„ 6	„ 1	„ 3	—	Confluent	„	—	Inf.	—	3 weeks ago, no result.	—	894
1625	3112	P. R.	F.	32	„ 6	„ 1	„ 5	—	Discrete	„	—	Inf.	—	—	—	920
1626	3113	E. T.	F.	32	„ 6	„ 2	„ 4	—	Mild	„	—	Inf.	—	—	—	772
1627	3114	S. P.	F.	40	„ 6	„ 3	„ 5	May 7	Coherent	„	—	Inf.	3 plain	3 weeks ago, no result.	—	921

No.	Name and Notification Number.	Sex.	Age.	Date of				Type of Attack.	Result.	Date of Death.	Vaccination.		Re-vaccination Date.	Remarks.	No. in House Register.
				Notification.	Onset.	Rash.	Removal to Hospital.				Date	No. of Mark.			
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
				1896.											
1628	3115 S. R.	F.	52	May 6	May 5	May 7	—	Mild	Rec.	—	Inf.	—	Aged 5 years	——	887
1629	3116 M. A. D.	F.	50	" 7	Apr. 28	Apr. 30	—	Mild	"	—	Inf.	—	—	——	922
1630	3117 F. P.	M.	30	" 7	May 4	May 6	—	Discrete	"	—	Inf.	3 foveate	—	——	923
1631	3118 W. S.	M.	40	" 7	" 3	" 5	—	Confluent	D.	May 12	Inf.	—	—	——	924
1632	3119 J. S.	F.	$\frac{1}{12}$	" 7	—	—	—	Confluent	D.	" 8	Unvaccinated		—	——	786
1633	3120 E. T.	F.	39	" 7	May 1	May 4	May 8	Discrete	Rec.	—	Inf.	1 foveate	—	Large pustules on face	926
1634	— A. S.	F.	11	—	—	—	—	Mild	"	—	Inf.	—	—	Case not recognised	924
1635	3122 T. B.	M.	30	May 7	—	—	—	Confluent	D.	May 10	Unvaccinated		—	——	804
1636	3124 E. P.	M.	$\frac{10}{12}$	" 7	May 4	May 6	—	Coherent	Rec.	—	May 4	4 vesicles	—	——	805
1637	3125 E. M.	F.	43	" 7	" 3	" 5	May 12	Discrete	"	—	Unvaccinated		—	——	813
1638	3126 A. R.	M.	29	" 7	" 3	" 6	—	Confluent	D.	June 7	Inf.	—	—	——	927
1639	3127 F. T.	F.	16	" 7	" 2	" 6	—	Discrete	Rec.	—	Inf.	—	—	——	649
1640	3128 E. G.	F.	27	" 7	" 5	" 7	—	Mild	"	—	Inf.	—	—	——	928
1641	3129 M. G.	F.	25	" 7	Apr. 15	Apr. 17	—	Discrete	"	—	Inf.	—	—	——	929
1642	3130 L. M. B.	F.	12	" 7	May 4	May 5	—	Mild	"	—	Inf.	4 large	—	A doubtful case	930
1643	3131 C. W. T.	M.	15	" 7	" 5	" 7	—	Mild	"	—	Inf.	2 scars	Apr. 9, no result.	——	931
1644	3132 E. S.	M.	40	" 7	" 4	" 6	—	Mild	"	—	Inf.	—	—	Infected while attending cases	932
1645	3133 G. U.	M.	23	" 7	" 3	" 7	—	Mild	"	—	Inf.	—	—	——	933
1646	3134 M. B.	F.	4	" 8	" 2	" 5	—	Confluent	D.	May 14	Apr. 28, no result.	Unvaccinated.	—	Hæmorrhage	934
1647	3135 C. M. J.	F.	10	" 8	" 2	" 4	—	Confluent	D.	" 12	Unvaccinated		—	——	935
1648	3136 F. D.	F.	21	" 8	" 5	" 7	—	Discrete	Rec.	—	Inf.	—	—	——	936
1649	3137 M. A. J.	F.	45	" 8	" 5	" 7	—	Coherent	"	—	Inf.	—	Apr. 28, no result.	Stated that she had a severe attack of small-pox after birth, her mother having a mild attack at the time.	616
1650	3138 M. D.	F.	48	" 8	" 4	" 8	May 9	Discrete	"	—	Inf.	3 faint	Apr. 30 (1 taking).	——	752
1651	3139 N. E.	F.	11	" 8	" 5	" 7	" 9	Mild	"	—	Inf.	4 smooth	Apr. 27 (2 places).	——	577
1652	3141 J. T.	M.	49	" 8	" 4	" 7	—	Discrete	"	—	Inf.	—	Apr. 27 (1, slight).	Eruption pustular	937
1653	3142 J. P.	M.	8	" 8	" 2	" 4	—	Malignant	D.	May 9	Unvaccinated		—	——	938
1654	3143 E. P. F.	M.	8	" 8	" 4	" 6	May 8	Confluent	D.	" 14	Unvaccinated		—	——	939
1655	3144 G. F. McK.	M.	39	" 8	" 4	" 7	" 12	Coherent	Rec.	—	Inf.	Not visible	Apr. 29	——	856
1656	3145 E. L. J.	M.	4	" 8	" 6	" 7	—	Malignant	D.	May 9	Apr. 24	—	—	A delicate child	241
1657	3146 C. W. F.	M.	35	" 9	" 3	" 6	—	Confluent	D.	" 16	Unvaccinated		—	Mother stated that he had never been vaccinated; they were "moving house" at the time.	941
1658	3147 E. F.	M.	42	" 9	" 6	" 7	—	Discrete	Rec.	—	Inf.	—	—	——	942
1659	3148 J. G. C.	M.	5	" 9	" 5	" 8	—	Coherent	"	—	Unvaccinated		—	——	943
1660	3150 N. C.	F.	19	" 9	" 1	" 5	—	Confluent	"	—	Inf.	—	—	——	652
1661	3151 F. W.	F.	32	" 9	Apr. 30	" 3	—	Coherent	"	—	Inf.	—	—	——	767

1662	3152	H. E. B.	F.	33	,, 9	—	,, 8	—	Discrete	,,	—	Inf.	—	—	—	944
1663	3153	J. B.	M.	27	,, 9	May 5	,, 7	May 9	Coherent	,,	—	Inf.	3 faint	—	—	945
1664	3155	M. A. P.	F.	32	,, 9	,, 7	,, 7	—	Confluent	D.	May 12	Inf.	—	—	Abortion, 6 months	946
1665	3156	J. P.	F.	3	,, 9	,, 4	,, 7	—	Confluent	Rec.	—	May 4	4 vesicles	—	—	805
1666	3157	H. S.	F.	3	,, 9	,, 7	,, 9	—	Coherent	,,	—	Unvaccinated		—	—	947
1667	3158	G. G.	M.	8	,, 9	,, 5	,, 7	—	Coherent	,,	—	Unvaccinated		—	Followed scarlet fever	925
1668	3159	J. M.	M.	9	,, 9	,, 5	,, 7	May 12	Coherent	,,	—	Apr. 30	2 vesicles	—	—	813
1669	3160	L. P.	F.	22	,, 9	,, 4	,, 6	—	Discrete	,,	—	Inf.	—	Apr. 30 (3)	—	948
1670	3161	H. W.	M.	6	,, 9	,, 5	,, 8	—	Confluent	,,	—	Unvaccinated		—	—	56
1671	3162	A. W.	M.	3	,, 9	,, 5	,, 8	—	Confluent	D.	May 14	Unvaccinated		—	—	56
1672	3163	J. J.	F.	30	,, 9	,, 6	,, 8	—	Malignant	D.	,, 18	Inf.	7 scars	—	Scanty rash; delirium; coma; exhaustion.	949
1673	3164	F. W.	M.	20	,, 9	,, 6	,, 9	—	Coherent	Rec.	—	Inf.	3 plain	—	—	950
1674	3165	C. S.	F.	38	,, 9	,, 4	,, 9	—	Coherent	,,	—	Unvaccinated		—	Mother said to have had small-pox at time of birth of C. S. Severe hysteria.	932
1675	3166	J. B.	M.	60	,, 9	,, 5	,, 7	May 9	Discrete	,,	—	Inf.	2 faint	Aged 14, no result; Apr. 25 (3).	Small-pox at 13 years of age	951
1676	3167	E. A. B.	F.	30	,, 9	,, 6	,, 8	,, 11	Coherent	,,	—	Inf.	—	May 5 (2 taking).	—	871
1677	3168	H. H.	M.	25	,, 9	,, 7	,, 9	—	Mild	,,	—	Inf.	3 foveate	—	—	952
1678	3170	M. G.	F.	38	,, 10	,, 5	,, 7	—	Malignant	D.	May 14	Unvaccinated		—	—	498
1679	3171	E. J.	F.	48	,, 10	,, 9	,, 10	—	Mild	Rec.	—	Inf.	—	9 and 18 years ago.	—	953
1680	3172	M. E. J.	F.	26	,, 10	,, 6	,, 8	—	Mild	,,	—	Inf.	4 plain	—	—	954
1681	3173	A. C.	M.	64	,, 10	,, 5	,, 6	—	Confluent	D.	May 14	Inf.	—	—	—	728
1682	3174	M. L.	F.	51	,, 10	,, 8	,, 10	May 11	Confluent	D.	,, 25	Aged 7yrs.	2 faint	—	Sister to No. 1483	849
1683	3175	M. P.	F.	8	,, 10	,, 8	,, 10	,, 11	Confluent	D.	,, 21	Unvaccinated		—	—	895
1684	3176	H. G.	F	5 wks.	,, 10	,, 8	,, 10	,, 11	Confluent	D.	,, 15	Unvaccinated		—	—	672
1685	3177	K. S.	F.	33	,, 10	,, 9	,, 10	—	Confluent	Rec.	—	Inf.	—	—	—	808
1686	3178	J. T.	M.	34	,, 11	,, 5	,, 10	—	Discrete	,,	—	Inf.	—	—	—	772
1687	3179	P. H.	F.	21	,, 11	,, 8	,, 5	—	Discrete	,,	—	Inf.	—	—	—	955
1688	3180	A. S.	F.	1	,, 11	,, 5	,, 9	—	Confluent	D.	May 18	May 4	—	—	Pustules of various sizes	956
1689	3181	A. C.	F.	10	,, 11	,, 7	,, 9	—	Confluent	Rec.	—	Unvaccinated		—	—	957
1690	3186	W. B.	M.	22	,, 12	,, 6	,, 8	May 11	Mild	,,	—	Inf.	2 foveate	—	—	962
1691	3183	W. E.	M.	45	,, 11	,, 8	,, 11	—	Discrete	,,	—	Inf.	—	—	—	959
1692	3184	W. L.	M.	40	,, 11	,, 4	,, 5	—	Mild	,,	—	Inf.	—	—	—	823
1693	3185	F. E.	M.	70	,, 11	,, 5	,, 7	May 12	Mild	,,	—	Inf.	2 faint	—	—	960
1694	—	G. B.	M.	38	,, 14	,, 11	,, 13	,, 14	Coherent	,,	—	Inf.	3 faint	—	Hæmorrhage into vesicles	871
1695	3187	D. S.	F.	4	,, 12	,, 7	,, 9	—	Confluent	D.	May 16	Apr. 15	3 scabs	—	At my visit, on May 11, found eruption more marked on arms than face; at vaccination site three inflamed areas, one about $\frac{1}{8}''$, two $\frac{1}{12}''$ diameter, each with dark scab in centre. She was vaccinated during her mother's attack, No. 1,207.	690
1696	3189	S. H.	M.	22	,, 12	,, 11	,, 12	—	Confluent	Rec.	—	Inf.	1 foveate	—	—	961
1697	—	E. U.	F.	24	—	—	—	—	Mild	,,	—	Inf.	—	—	—	933
1698	3190	M. W.	F.	3	May 12	Apr. 21	Apr. 23	—	Mild	,,	—	Unvaccinated		—	—	678
1699	3191	P. W.	F.	1	,, 12	May 1	May 3	—	Confluent	D.	May 14	Unvaccinated		—	—	678
1700	3192	G. E. W.	M.	40	,, 12	,, 9	,, 12	—	Confluent	D.	,, 19	Unvaccinated		—	Born in Gloucester	678
1701	—	M. F. W.	F.	16	—	Apr. 28	Apr. 30	—	Mild	Rec.	—	Inf.	—	—	—	678

No.	Name and Notification Number.	Sex.	Age.	Date of Notification.	Date of Onset.	Date of Rash.	Date of Removal to Hospital.	Type of Attack.	Result.	Date of Death.	Vaccination. Date.	Vaccination. No. of Marks.	Re-vaccination Date.	Remarks.	No. in House Register.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1702	3193 M. E.	F.	8	1896. May 12	May 9	May 11	—	Coherent	Rec.	—	May 6	2 vesicles	—	Papules of various sizes	585
1703	3195 E. H.	F.	33	„ 12	„ 6	„ 7	—	Confluent	„	—	Inf.	—	—	Nursing infant, 7 months old, who was attacked later (No. 1822).	963
1704	3196 P. W.	M.	1	„ 12	—	„ 11	—	Discrete	„	—	Unvaccinated		—	——	56
1705	3197 M. L.	F.	7	„ 12	May 8	„ 9	—	Confluent	„	—	Unvaccinated		—	——	722
1706	3198 A. T.	F.	$\frac{10}{12}$	„ 12	„ 9	„ 11	—	Confluent	D.	May 28	Unvaccinated		—	——	964
1707	3199 M. G.	F.	3	„ 12	„ 9	„ 11	—	Confluent	D.	May 20	Unvaccinated		—	——	929
1708	3201 M. H.	F.	24	„ 12	„ 9	„ 11	—	Discrete	Rec.	—	Inf.	—	—	——	875
1709	3203 G. S.	M.	31	„ 13	„ 11	„ 12	—	Confluent	„	—	Inf.	—	—	——	828
1710	3204 W. G. P.	M.	13	„ 13	„ 11	„ 12	—	Mild	„	—	Inf.	4 foveate	—	——	584
1711	3205 L. E. T.	F.	5	„ 13	„ 9	„ 12	—	Confluent	„	—	Unvaccinated		—	——	965
1712	3206 E. M.	F.	25	„ 13	„ 10	„ 12	—	Confluent	„	—	Inf.	—	—	Hæmorrhage into pocks	862
1713	3207 A. H.	M.	40	„ 13	„ 10	„ 12	May 13	Confluent	D.	May 19	Aged 10	3 faint	24 years ago, no result.	Hæmorrhage into pocks	569
1714	3208 P. R.	F.	34	„ 13	„ 10	„ 12	—	Mild	Rec.	—	Inf.	—	—	——	865
1715	3209 S. T.	M.	13	„ 13	„ 11	„ 13	—	Mild	„	—	Inf.	—	Two attempts failed.	——	966
1716	3210 W. M.	M.	38	„ 13	„ 10	„ 12	—	Coherent	„	—	Inf.	—	May 5, no result.	——	967
1717	3211 H. B.	M.	70	„ 13	„ 8	„ 10	May 13	Confluent	D.	May 17	Aged 8	3 faint	—	Hæmorrhage into pocks	857
1718	3212 N. W.	F.	9	„ 13	„ 3	„ 5	„ 14	Confluent	Rec.	—	Unvaccinated		—	——	968
1719	3213 H. H.	M.	5	„ 13	„ 10	„ 12	—	Confluent	D.	May 22	May 7	—	—	——	969
1720	3214 M. H.	F.	32	„ 13	„ 5	„ 7	—	Mild	Rec.	—	Inf.	—	—	——	970
1721	3215 B. V.	F.	8	„ 13	„ 10	„ 12	—	Mild	„	—	Inf.	4	—	——	908
1722	3216 A. C. W.	M.	$\frac{3}{12}$	„ 13	„ 9	„ 11	—	Confluent	D.	May 23	May 7	—	—	——	801
1723	3217 A. M.	F.	7	„ 14	„ 7	„ 9	—	Confluent	D.	„ 20	Unvaccinated		—	——	971
1724	3218 G. J. E.	M.	32	„ 14	„ 9	„ 12	—	Discrete	Rec.	—	Inf.	—	—	——	972
1725	3219 R. B.	F.	9	„ 44	„ 11	„ 13	—	Mild	„	—	Inf.	—	—	——	842
1726	3221 F. F.	F.	22	„ 14	—	—	—	Confluent	D.	May 17	Inf.	—	—	——	884
1727	3222 W. C. D.	M.	40	„ 14	May 6	May 8	—	Discrete	Rec.	—	Inf.	—	Aged 9	Employed on small-pox hospital buildings.	973
1728	3223 S. M'L.	M.	30	„ 14	„ 12	„ 13	—	Discrete	„	—	Inf.	—	—	——	974
1729	3224 A. G.	F.	2	„ 14	„ 10	„ 12	—	Coherent	„	—	Unvaccinated		—	——	929
1730	3225 A. M.	M.	1	„ 14	„ 12	„ 14	—	Confluent	„	—	Unvaccinated		—	Attempt at vaccination, Apr. 20, failed.	862
1731	3226 C. C.	M.	21	„ 15	„ 10	„ 13	May 15	Mild	„	—	Inf.	4 plain	2 months ago, no result.	——	975
1732	— R. E.	F.	50	—	„ 16	„ 18	—	Discrete	„	—	Inf.	—	—	——	917
1733	3229 D. J. W.	M.	27	May 15	„ 9	„ 13	—	Discrete	„	—	Inf.	6	5 weeks ago, no result.	——	587
1734	3230 W. C.	M.	29	„ 15	„ 12	„ 14	—	Confluent	D.	May 20	Unvaccinated		—	Not vaccinated because of "delicacy" as infant.	976
1735	3231 D. W.	M.	$\frac{3}{12}$	„ 15	„ 8	„ 10	—	Coherent	Rec.	—	Unvaccinated		—	——	767
1736	3232 E. R.	M.	12	„ 15	„ 10	„ 12	—	Mild	„	—	Inf.	4 foveate	—	——	865

1737	—	A. T.	M.	26	—	,, 20	,, 22	—	Mild	,,	—	Inf.	3 foveate	—	—	952
1738	3234	J. B.	M.	27	May 15	Apr. 29	Apr. 30	—	Coherent	,,	—	Inf.	—	Apr. 27 (2 slight).	—	977
1739	3235	E. W.	F.	$\frac{4}{12}$	,, 15	May 14	May 15	—	Confluent	D.	May 24	May 7	3 vesicles	—	—	107
1740	3236	A. F.	M.	6	,, 15	,, 13	,, 14	—	Confluent	Rec.	—	Unvaccinated		—	—	868
1741	3237	S. B.	F.	35	,, 16	,, 13	,, 15	—	Mild	,,	—	Inf.	—	—	—	842
1742	3238	J. P.	M.	$\frac{18}{12}$	,, 16	, 14	,, 16	May 17	Confluent	D.	May 21	Unvaccinated		—	—	895
1743	3239	S. C.	F.	2	,, 16	,, 15	,, 17	—	Confluent	D.	,, 26	May 14	(taking)	—	—	814
1744	3240	W. C.	M.	21	,, 16	,, 13	,, 15	—	Coherent	Rec.	—	Inf.	3	—	—	978
1745	3241	F. S.	M.	1	,, 16	,, 15	,, 17	—	Coherent	,,	—	Unvaccinated		—	—	932
1746	3242	F. G. D.	M.	2	,, 17	,, 12	,, 14	—	Coherent	,,	—	Unvaccinated		—	—	979
1747	3243	E. B.	F.	32	,, 17	,, 14	,, 16	May 17	Confluent	D.	May 24	Unvaccinated		—	Tuberculosis of lungs and skin; three attempts to vaccinate in infancy, without result.	980
1748	3244	E. W.	F.	65	,, 17	,, 11	,, 14	—	Discrete	Rec.	—	Inf.	—	—	—	877
1749	3245	R. B.	M.	3	,, 17	,, 15	,, 17	—	Confluent	,,	—	Unvaccinated		—	Hæmorrhage into pocks; 2 failures to vaccinate 6 weeks ago.	981
1750	3246	A. E.	M.	26	,, 17	,, 8	,, 13	—	Discrete	,,	—	Inf.	—	—	—	982
1751	3248	H. G.	M.	6	,, 18	,, 12	,, 14	—	Confluent	D.	May 23	Unvaccinated		—	—	498
1752	3249	H. G.	F.	4	,, 18	,, 12	,, 14	—	Confluent	D.	,, 23	Unvaccinated		—	—	498
1753	3250	S. W.	F.	55	,, 18	,, 15	,, 18	—	Confluent	D.	,, 24	Inf.	—	—	—	494
1754	3251	C. H.	M.	26	,, 18	,, 13	,, 15	—	Mild	Rec.	—	Inf.	4	—	—	983
1755	3252	S. S.	F.	22	,, 18	,, 14	,, 16	—	Coherent	,,	—	Inf.	—	—	—	984
1756	3253	E. B.	F.	2	,, 18	,, 15	,, 17	—	Confluent	,,	—	Unvaccinated		—	—	985
1757	3254	C. B.	F.	56	,, 18	,, 16	,, 18	—	Coherent	D.	June 6	Inf.	—	—	—	986
1758	3255	F. M. E.	F.	7	,, 18	,, 14	,, 16	—	Confluent	Rec.	—	Unvaccinated		—	—	987
1759	3256	J. C.	M.	27	,, 18	,, 15	,, 17	—	Confluent	,,	—	Inf.	—	—	—	988
1760	3257	J. A.	M.	46	,, 18	,, 15	,, 17	—	Mild	,,	—	Inf.	No marks	May 8 (2)	—	892
1761	3258	W. G.	F.	$\frac{2}{12}$	,, 18	,, 13	,, 14	—	Confluent	D.	May 23	Unvaccinated		—	—	989
1762	3259	J. L.	M.	24	,, 19	,, 13	,, 16	—	Confluent	Rec.	—	Inf.	—	—	—	565
1763	3261	A. D.	F.	$\frac{3}{12}$	,, 19	,, 15	,, 16	—	Confluent	D.	May 25	Unvaccinated		—	Failure to vaccinate, April 17	990
1764	3262	C. J. D.	M.	22	,, 19	,, 17	,, 19	—	Discrete	Rec.	—	Inf.	—	—	—	936
1765	3263	M. D.	F.	8	,, 19	,, 15	,, 17	—	Mild	,,	—	Inf.	3 large, smooth.	—	—	364
1766	3264	J. D.	M.	55	,, 19	,, 16	,, 18	May 19	Confluent	D.	May 22	Inf. (alleged).	No marks	—	Hæmorrhage into skin	991
1767	3265	T. D.	M.	3	,, 19	,, 15	,, 17	—	Confluent	D.	,, 24	Unvaccinated		—	—	992
1768	3266	W. B.	M.	17 days	,, 20	,, 17	,, 19	—	Malignant	D.	,, 23	Unvaccinated		—	—	944
1769	3267	A. P.	M.	44	,, 20	—	,, 16	—	Mild	Rec.	—	Inf.	3 marks(r) 3 marks(l)	20 years ago	—	805
1770	3313	A. H.	M.	16	,, 29	May 21	,, 26	—	Mild	,,	—	Inf.	3 large	Twice failed (Mar. and Apr.)	—	1008
1771	3269	W. D.	F.	13	,, 20	,, 14	,, 18	—	Discrete	,,	—	Inf.	3 good	—	—	993
1772	3270	J. B.	M.	29	,, 21	,, 16	,, 19	—	Discrete	,,	—	Inf.	1 foveate	Mar. 29 (3 stains).	The marks of re-vaccination on May 25 were very small, superficial, and faint. Probably no scar would remain.	994
1773	3271	E. H.	F	1	,, 21	,, 17	,, 20	—	Confluent	D.	May 30	Unvaccinated		—	—	970
1774	3272	A. D.	M.	41	,, 21	,, 12	,, 16	—	Mild	Rec.	—	Inf.	—	—	—	995
1775	3273	E. T.	F.	46	,, 21	,, 19	,, 21	—	Mild	,,	—	Inf.	—	—	—	649
1776	3274	W. O.	M.	10	,, 21	,, 19	,, 21	—	Mild	,,	—	Inf.	—	—	—	996
1777	3275	F. B.	M.	21	,, 21	,, 19	,, 21	—	Discrete	,,	—	Inf. ?	No marks	—	—	997
1778	3276	E. M.	F.	30	,, 21	,, 19	,, 21	—	Discrete	,,	—	Inf.	—	—	—	998

No	Name and Notification Number.	Sex.	Age.	Date of				Type of Attack.	Result.	Date of Death.	Vaccination.		Re-vaccination Date.	Remarks.	No. in House Register.
				Notification.	Onset.	Rash.	Removal to Hospital.				Date.	No. of Marks.			
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1779	3278 N. F. S.	F.	15	1896. May 21	May 13	May 15	—	Mild	Rec.	—	Inf.	3 good	—	——	932
1780	3279 E. M.	M.	2	„ 22	—	„ 17	—	Discrete	„	—	May 9	3 good	—	Multiform pustules	510
1781	3280 L. B.	F.	$\frac{7}{12}$	„ 22	May 17	„ 19	—	Discrete	„	—	Unvaccinated		—	Attempted vaccination May 5th, nil.	938
1782	3281 M. C.	F.	7	„ 22	„ 19	„ 22	—	Coherent	„	—	Unvaccinated		—	——	904
1783	3284 A. W.	F.	24	„ 23	„ 14	„ 16	—	Coherent	„	—	Inf.	—	—	Contracted in nursing and bathing No. 1619.	916
1784	— E. W.	F.	10	„ 30	„ 25	„ 27	—	Mild	„	—	Inf.	2 faint	—	——	1027
1785	3330 E. Y.	F.	24	„ 30	„ 14	„ 17	—	Mild	„	—	Inf.	—	5 weeks ago, 1 slight mark.	Contracted in nursing No. 1624	934
1786	3324 W. S.	M.	5	„ 30	„ 17	„ 19	—	Confluent	„	—	Unvaccinated		—	——	924
1787	3325 E. S.	F.	9	„ 30	„ 18	„ 20	—	Mild	„	—	Unvaccinated		—	——	924
1788	3326 E. S.	F.	3	„ 30	„ 18	„ 20	—	Confluent	„	—	Unvaccinated		—	——	924
1789	— H. T.	M.	4	—	„ 16	„ 18	—	Confluent	„	—	Unvaccinated		—	——	999
1790	— H. S.	M.	18	—	„ 3	„ 7	—	Mild	„	—	Inf.	—	—	Infected whilst attending cases. Abscesses followed.	1000
1791	— C. H.	M.	16	—	„ 13	„ 15	—	Discrete	„	—	Inf.	—	Re-vaccinated April, failed.	——	1001
1792	— G. H.	M.	26	—	„ 15	„ 17	—	Mild	„	—	Inf.	—	6 weeks ago, no result.	——	1002
1793	3283 F. S.	F.	14	May 23	„ 17	„ 19	—	Discrete	„	—	Inf.	4 (2 foveate).	—	——	947
1794	3285 M. W.	F.	4	„ 23	„ 18	„ 20	May 23	Confluent	D.	May 31	May 18	4 vesicles	—	——	968
1795	3286 H. W.	M.	6	„ 23	„ 18	„ 20	„ 23	Confluent	Rec.	—	„ 18	3 vesicles	—	——	968
1796	3287 E. O.	F.	36	„ 23	„ 17	„ 20	—	Mild	„	—	Inf.	—	—	——	996
1797	3288 E. J. T.	F.	31	„ 23	„ 14	„ 16	—	Confluent	„	—	Inf.	2	—	——	886
1798	3289 M. R.	F.	25	„ 23	„ 21	„ 23	—	Mild	„	—	Inf.	—	—	——	927
1799	3290 W. C. H.	M.	54	„ 24	„ 20	„ 23	—	Coherent	„	—	Inf.	4 plain	—	——	1003
1800	3291 R. B.	M.	38	„ 24	„ 21	„ 23	May 24	Confluent	D.	May 29	Inf. (alleged)	No marks	—	With hæmorrhage	1004
1801	3292 F. P.	F.	33	„ 24	„ 21	„ 23	—	Discrete	Rec.	—	Inf.	—	—	——	950
1802	3314 A. J. W.	M.	3	„ 29	„ 27	„ 28	—	Confluent	„	—	Unvaccinated		—	——	1009
1803	3295 C. T.	M.	18	„ 25	„ 23	„ 25	May 26	Discrete	„	—	Inf.	3 foveate	—	——	965
1804	3296 J. T.	M.	$\frac{9}{12}$	„ 25	„ 23	„ 25	„ 26	Confluent	D.	May 28	Unvaccinated		—	——	965
1805	3297 F. G. T.	M.	3	„ 25	„ 22	„ 23	—	Malignant	D.	„ 26	Unvaccinated		—	" Pyæmia," hæmorrhage.	965
1806	— L. C.	F.	22	—	—	About May 25	—	Mild (inoculated).	Rec.	—	Inf.	—	6 weeks (2)	Inoculated by Mrs. S. (No. 1674) whom she was nursing. 2 pustules, on cheek.	932
1807	3298 S. T.	M.	7	May 26	May 24	May 26	May 26	Coherent	„	—	Unvaccinated		—	——	965
1808	3299 F. O.	F.	3	„ 26	„ 21	„ 24	—	Confluent	D.	June 5	Unvaccinated		—	——	996
1809	3300 R. B.	M.	23	„ 26	„ 21	„ 25	—	Discrete	Rec.	—	Inf.	—	Twice in last 6 weeks, no result.	——	1006

1810	3301	P. H.	F.	50	„ 26	„ 22	„ 26	—	Discrete	„	—	Inf.	—	—	—	955
1811	3370	W. R.	M.	3	„ 30	„ 30	June 1	—	Confluent	D.	June 2	Unvaccinated		—	—	964
1812	3304	E. T.	F.	3	„ 27	„ 23	May 27	—	Confluent	D.	May 31	Unvaccinated		—	—	964
1813	3306	C. C.	M.	43	„ 27	„ 26	„ 27	—	Confluent	Rec.	—	Inf.	—	—	—	1007
1814	3315	C. G.	F.	28	„ 29	„ 25	„ 27	May 30	Confluent	D.	May 31	Inf.	No marks	—	—	1010
1815	3316	M. A. S.	F.	35	„ 29	„ 25	„ 26	—	Discrete	Rec.	—	Inf.	—	—	—	1011
1816	3318	G. H. H.	M.	29	„ 29	„ 28	„ 29	—	Coherent	„	—	Inf.	—	—	—	1012
1817	3307	A. B.	F.	5	„ 28	„ 25	„ 27	May 28	Coherent	„	—	Unvaccinated		—	—	977
1818	3308	E. P.	F.	12	„ 28	„ 24	„ 25	—	Mild	„	—	Inf.	3 (2 foveate).	—	—	855
1819	3309	W. G.	M.	6	„ 28	„ 14	„ 16	—	Confluent	„	—	Unvaccinated		—	—	929
1820	3310	S. G.	M.	5	„ 28	„ 17	„ 21	—	Confluent	D.	June 4	Unvaccinated		—	With hæmorrhage	929
1821	3311	W. H. S.	M.	$\frac{16}{12}$	„ 28	„ 26	„ 27	—	Confluent	Rec.	—	Unvaccinated		—	A severe case, infant sister (No.1695) recently vaccinated, died.	690
1822	3317	W. H.	M.	$\frac{7}{12}$	„ 29	„ 28	„ 29	—	Confluent	„	—	Unvaccinated		—	—	963
1823	3319	J. J.	M.	34	„ 30	„ 24	„ 27	—	Discrete	„	—	Inf.	—	—	—	1013
1824	3327	C. H.	M.	14	„ 30	„ 23	„ 25	—	Discrete	„	—	Inf.	2 fair	2 months since, no scar.	States that one of re-vaccination sites "rose a little," and there were enlarged axillary glands.	1014
1825	3331	P. C.	M.	12	„ 30	„ 26	„ 28	—	Confluent	D.	June 24	Unvaccinated		—	—	1015
1826	3332	J. A. S.	M.	39	„ 30	„ 26	„ 30	—	Discrete	Rec.	—	Inf.	—	—	—	1016
1827	3333	W. S.	M.	25	„ 30	„ 28	„ 30	May 31	Mild	„	—	Inf.	2 faint	May 20, nil	—	1017
1828	3335	G. F.	M.	27	„ 30	„ 29	„ 30	—	Confluent	„	—	Inf.	—	—	Said to have had small-pox in childhood: intemperate; much œdema of face.	1018
1829	3336	F. L.	M.	34	„ 30	„ 28	„ 30	May 31	Discrete	„	—	Inf.	3 plain	—	—	1019
1830	3337	E. N.	F.	22	„ 30	„ 20	„ 23	—	Mild	„	—	Inf.	—	3 weeks ago, nil.	—	1020
1831	3346	D. C.	F.	4	„ 30	„ 24	„ 26	—	Confluent	D.	June 2	May 19	3 vesicles	—	—	1021
1832	3345	E. C.	F.	6	—	„ 24	„ 26	—	Coherent	Rec.	—	„ 19	3 vesicles	—	—	1021
1833	3347	L. C.	F.	$\frac{9}{12}$	—	„ 24	„ 26	—	Coherent	„	—	Unvaccinated		—	—	1021
1834	3351	M. B.	F.	50	May 31	„ 26	„ 29	—	Confluent	D.	June 6	Inf.	—	—	—	1022
1835	3352	C. T. H.	M.	3	„ 31	„ 26	„ 29	—	Discrete	Rec.	—	Unvaccinated		—	—	1023
1836	3353	J. T. M.	M.	15	„ 31	„ 25	„ 26	—	Discrete	„	—	Inf.	4 foveate	—	—	1024
1837	3354	E. M.	F.	50	„ 31	„ 24	„ 29	—	Mild	„	—	Inf.	—	—	—	1025
1838	3355	J. D.	F.	32	„ 31	„ 24	„ 28	—	Confluent	„	—	Inf.	—	—	—	1026
1839	3338	E. A. H.	F.	37	„ 30	—	—	—	Mild	„	—	Inf.	—	—	—	969
1840	3334	F. M.	M.	3	„ 30	May 28	May 30	—	Coherent	„	—	Unvaccinated		—	—	971
1841	3356	E. G.	F.	27	June 1	„ 25	„ 29	—	Coherent	„	—	Inf.	—	Aged 14	—	1028
1842	3357	E. A. L.	F.	33	„ 1	„ 28	„ 30	—	Discrete	„	—	Inf.	—	4 years ago, 4 attempts, no result.	—	1029
1843	3358	W. F. W.	M.	36	„ 1	„ 29	„ 31	June 1	Coherent	„	—	Inf.	2 large	—	Solid infiltration	1030
1844	3359	M. M.	F.	45	„ 1	„ 28	„ 30	„ 1	Confluent	D.	June 20	Unvaccinated		—	—	1031
1845	3360	M. H.	F.	3	„ 1	„ 27	„ 31	„ 3	Confluent	Rec.	—	Unvaccinated		—	—	81
1846	3361	H. P.	M.	47	„ 1	„ 27	„ 30	—	Mild	„	—	Inf.	—	—	14 days after return of son (No. 779) from hospital.	447
1847	3362	S. T.	F.	74	„ 1	„ 29	„ 31	—	Confluent	„	—	Aged 12	—	—	Was living at Harpney, near Gloucester, when vaccinated; small-pox then prevalent. Arm was "bad," and she was said to have had "cow-pox and small-pox."	1032
1848	3363	A. B.	F.	23	„ 1	„ 27	„ 31	—	Mild	„	—	Inf.	—	—	—	1033

No.	Name and Notification Number.	Sex.	Age.	Date of				Type of Attack.	Result.	Date of Death.	Vaccination.		Re-vaccination Date.	Remarks.	No. in House Register.
				Notification.	Onset.	Rash.	Removal to Hospital.				Date.	No. of Marks.			
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
				1896.											
1849	3364 T. J.	M.	28	June 1	May 29	May 30	—	Confluent	Rec.	—	Inf.	4 plain	—	——	1034
1850	3365 L. E. S.	F.	23	,, 1	,, 29	,, 31	—	Confluent	,,	—	Inf.	—	—	——	1035
1851	3367 E. A. F.	F.	11	,, 2	,, 28	,, 30	June 1	Confluent	,,	—	Inf.	1 very faint	—	——	1036
1852	3368 E. B.	M.	13	,, 2	,, 30	June 2	—	Mild	,,	—	Inf.	4 foveate	—	——	1037
1853	3369 H. G.	M.	16	,, 2	,, 31	,, 1	—	Coherent	,,	—	Inf.	4 small	—	——	1038
1854	3371 M. S.	F.	26	,, 2	,, 28	May 31	—	Coherent	,,	—	Inf.	—	—	——	1039
1855	3372 L. H.	F.	13	,, 2	,, 31	June 2	June 3	Mild	,,	—	Inf.	4 foveate	—	——	1040
1856	3373 C. M. W.	F.	55	,, 2	,, 27	May 29	—	Discrete	,,	—	Inf.	—	—	——	1041
1857	3375 A. C.	F.	8	,, 2	,, 31	June 2	—	Confluent	,,	—	Unvaccinated		—	——	904
1858	3376 J. C.	F.	5	,, 2	,, 31	,, 2	—	Confluent	,,	—	Unvaccinated		—	——	904
1859	3377 G. F.	M.	35	,, 2	,, 30	,, 1	—	Mild	,,	—	Inf.	4(2foveate)	—	——	1042
1860	3379 E. A. B.	F.	7	,, 2	,, 29	May 31	June 3	Confluent	,,	—	Unvaccinated		—	——	1043
1861	3444 W. G.	M.	25	,, 17	—	—	—	Discrete	,,	—	Inf.	4 foveate	—	——	1038
1862	3380 E. L.	F.	57	,, 3	May 27	June 1	—	Discrete	,,	—	Inf.	—	—	——	1044
1863	3381 W. D.	M.	23	,, 3	,, 29	May 31	June 3	Discrete; abortive.	,,	—	Inf.	4 foveate	4 months ago, unsuccessful.	——	1045
1864	3382 R. M.	M.	73	,, 3	,, 31	June 2	,, 3	Coherent	,,	—	Inf. (alleged)	2 doubtful	—	Paralysis agitans	1046
1865	3384 J. H.	M.	38	,, 3	,, 28	,, 2	—	Discrete	,,	—	Inf.	—	—	——	1047
1866	3385 E. J.	F.	28	,, 3	,, 31	,, 3	—	Discrete	,,	—	Inf.	—	—	Large pustules	1048
1867	3387 G. G. E.	M.	4	,, 3	,, 29	May 31	—	Confluent	D.	June 13	Unvaccinated		—	——	987
1868	3391 H. D.	M.	8	,, 3	,, 30	June 1	—	Confluent	D.	,, 12	Unvaccinated		—	——	992
1869	3392 A. G.	F.	20	,, 3	,, 27	May 30	—	Coherent	Rec.	—	Inf.	4 small scars.	—	——	1049
1870	3393 H. B.	F.	28	,, 3	,, 29	June 1	—	Mild	,,	—	Inf.	—	—	Inoculated on nose by her child (No. 1756). General rash followed 7 days later.	985
1871	3394 D. T.	F.	8	,, 3	,, 31	,, 2	—	Discrete	,,	—	Unvaccinated		Attempted in March 1896.	Large pustules. 5 linear streaks remain at vaccinal site.	937
1872	3395 E. C.	F.	21	,, 3	,, 28	,, 2	—	Coherent	,,	—	Inf.	—	—	——	1050
1873	— B. B.	F.	21	—	?	?	—	Discrete	,,	—	Inf.	—	2 months ago	Employed in nursing Mrs. H., No. 1703.	963
1874	3398 C. W.	M.	9/12	June 4	June 1	June 1	—	Confluent	D.	June 13	Unvaccinated		—	Six weeks ago, failure at vaccination.	1051
1875	3399 M. C.	F.	5/12	,, 4	,, 1	,, 3	June 5	Confluent	D.	,, 14	Unvaccinated		—	Hæmorrhage into few pocks	957
1876	3400 A. T.	F.	39	,, 4	,, 1	,, 3	—	Mild	Rec.	—	Inf.	3 faint	2 months ago; no result; only 2 small red marks.	——	999
1877	3401 A. R.	M.	26	,, 5	,, 1	,, 4	—	Discrete	,,	—	Inf.	—	—	——	964
1878	3403 W. C. M.	M.	40	,, 5	,, 3	,, 5	June 5	Discrete	,,	—	Inf.	1 foveate	—	——	732
1879	3404 A. M.	M.	1	,, 5	,, 3	,, 5	,, 5	Confluent	D.	June 8	Unvaccinated		—	——	1031
1880	3405 M. A. F.	F.	50	,, 5	,, 1	,, 3	,, 6	Mild	Rec.	—	Aged 10	3 faint	—	——	1052
1881	3406 E. T.	F.	38	,, 5	,, 2	,, 3	—	Confluent	,,	—	Inf.	—	—	——	1053

1882	3407	P. G.	F.	54	„ 5	„ 3	„ 5	—	Mild	„	—	Inf.	—	—	Advanced heart disease. Daughter (No. 1869) engaged in visiting and bathing cases.	1049
1883	3408	L. G.	F.	10	„ 5	„ 3	„ 5	—	Mild	„	—	Inf.	4 foveate	—	—	1049
1884	3409	M. M.	F.	35	„ 6	„ 2	„ 4	—	Mild	„	—	Inf.	—	—	—	1054
1885	3410	J. C.	M.	31	„ 6	May 30	„ 2	—	Discrete	„	—	Inf.	—	—	—	1055
1886	3411	W. B.	M.	45	„ 6	June 2	„ 3	—	Coherent	„	—	Inf.	—	—	Employed in driving cab in service of Mr. P. Had himself visited a case (No. 1789) and assisted the bathing.	1056
1887	3412	A. B.	M.	26	„ 6	„ 2	„ 4	June 6	Mild	„	—	Inf.	2 faint	—	—	1057
1888	3413	A. E. G.	M.	23	„ 6	„ 1	„ 5	—	Discrete	„	—	Inf.	—	—	—	1058
1889	3414	W. D.	M.	20	„ 6	„ 2	„ 5	—	Discrete	„	—	Inf.	2 scars	—	—	634
1890	3415	F. P.	F.	63	„ 6	„ 2	„ 4	—	Discrete	„	—	Inf.	—	—	—	1059
1891	3416	G. R.	M.	37	„ 7	„ 3	„ 6	—	Coherent	„	—	Inf.	—	—	—	1060
1892	3417	T. P.	M.	38	„ 7	„ 1	„ 3	June 8	Confluent	„	—	Inf.	2 good	14 years ago (1 place).	Some hæmorrhage into pocks.	1061
1893	3418	F. B.	F.	40	„ 8	„ 5	„ 8	—	Malignant	D.	June 9	Inf.	—	—	Wife to No. 1800; removed to another house.	1062
1894	—	W. A.	M.	22	—	„ 2	„ 3	—	Mild	Rec.	—	Inf.	—	—	—	1063
1895	3419	G. S.	F.	9	June 9	„ 7	„ 9	—	Confluent	„	—	Unvaccinated		—	—	1064
1896	3420	S. F. L.	M.	7	„ 9	„ 7	„ 9	June 10	Discrete	„	—	Inf.	2(1 foveate)	—	A fairly typical foveate scar below elbow of right arm (the vaccination marks being in usual site). Mother states he was vaccinated in two places only, and that this lower scar was due to a scald at 2 months old, ? Inoculated from vaccine vesicles.	1065
1897	3421	W. C. S.	M.	7	„ 10	„ 9	„ 10	—	Confluent	D.	June 23	Unvaccinated		—	—	1064
1898	—	S. E. S.	F.	3	—	May 24	May 26	—	Confluent	D.	„ 2	Unvaccinated		—	—	1064
1899	3422	E. D. H.	F.	6	June 10	June 3	June 6	—	Coherent	Rec.	—	Unvaccinated		—	—	1046
1900	3423	M. L.	F.	5	„ 10	„ 6	„ 8	—	Malignant	D.	June 15	Unvaccinated		—	—	1066
1901	3424	A. McH.	F.	35	„ 10	„ 7	„ 9	—	Malignant	D.	„ 11	Unvaccinated		—	—	1067
1902	3425	E. D.	F.	38	„ 10	„ 3	„ 6	—	Coherent	Rec.	—	Inf.	—	—	—	973
1903	3426	F. C.	M.	43	„ 10	„ 8	„ 10	—	Mild	„	—	Inf.	2(1 foveate)	—	—	814
1904	3427	E. B.	F.	26	„ 10	„ 7	„ 10	—	Coherent	„	—	Inf.	—	—	—	1068
1905	2428	S. W.	F.	20	„ 11	„ 9	„ 10	—	Discrete	„	—	Inf.	—	—	Inoculated on chin from No. 1802.	1009
1906	—	H. T. S.	M.	4	—	May 26	May 26	—	Confluent	D.	June 10	Unvaccinated		—	—	1064
1907	—	E. A. S.	F.	13	—	„ 26	„ 26	—	Mild	Rec.	—	Inf.	2 (1 large, 1 small smooth).	—	—	1064
1908	—	T. J. S.	M.	39	—	—	June 9	—	Mild	„	—	Inf.	—	—	—	1064
1909	—	S. J. S.	F.	40	—	June 4	„ 6	—	Mild	„	—	Inf.	—	—	Inoculated on left lower eyelid	1064
1910	—	C. H. D.	M.	37	—	May 29	May 29	—	Mild	„	—	Inf.	—	—	Inoculated on finger, May 22, when attending child, No. 1767.	992
1911	3429	H. M.	M.	44	June 12	June 8	June 11	June 12	Coherent	„	—	Inf.	5 foveate	—	—	1069
1912	3430	M. S.	F.	$\frac{14}{12}$	„ 12	„ 9	„ 11	„ 13	Coherent	„	—	Unvaccinated		—	—	1064
1913	3431	L. W.	F.	13	„ 12	„ 9	„ 12	„ 13	Discrete	„	—	Inf.	4 slight foveate.	—	—	678
1914	3433	E. F.	F.	43	„ 12	„ 7	„ 10	„ 12	Mild	„	—	Inf.	2(1 foveate)	—	—	1070

No.	Name and Notification Number.	Sex.	Age.	Date of				Type of Attack.	Result.	Date of Death.	Vaccination.		Re-vaccination Date.	Remarks.	No. in House Register.
				Notification.	Onset.	Rash.	Removal to Hospital.				Date.	No. of Marks.			
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
				1896.											
1915	3436 M. F.	F.	34	June 13	June 10	June 12	June 14	Discrete	—	—	Inf.	2 foveate	—	Her infant, 13 days old, accompanied her to hospital. It was vaccinated on day of birth, and presented 4 large scabs with areola. It did not contract small-pox.	1036
1916	3435 C. C. M.	M.	22	„ 13	„ 8	„ 11	—	Coherent	—	—	Inf.	4 foveate	—	—	1025
1917	3439 W. H. A.	M.	30	„ 15	„ 8	„ 12	June 15	Mild	—	—	Inf.	2 smooth	—	—	1071
1918	3440 C. J. B.	M.	22	„ 15	„ 12	„ 14	„ 20	Discrete	—	—	Inf.	3 foveate	—	—	1072
1919	3442 L. M. P.	F.	13	„ 16	„ 11	„ 13	„ 16	Mild	—	—	Inf.	3 (2 foveate, 1 scar, large).	—	—	447
1920	3443 F. D.	M.	22	„ 16	„ 11	„ 13	—	Discrete	—	—	Inf.	3 large	—	—	1026
1921	3445 A. S.	F.	29	„ 17	„ 13	„ 15	June 17	Coherent	—	—	Inf.	3 plain	—	Psoriasis since aged 12	1073
1922	3446 L. H.	F.	11	„ 17	„ 17	„ 19	—	Discrete	—	—	Inf.	3 plain	—	Fine papules; rather profuse on face and wrist.	1023
1923	3447 W. H. K.	M.	13	„ 17	„ 16	„ 17	June 17	Discrete	—	—	Inf.	3 foveate	—	—	1074
1924	3450 W. C.	M.	17	„ 18	„ 14	„ 16	„ 18	Discrete	—	—	Inf.	3 foveate	—	Pustules of various sizes	1075
1925	3451 E. F.	F.	32	„ 18	„ 16	„ 18	„ 18	Discrete	—	—	Inf.	Indistinct	—	—	1042
1926	3454 A. W. T.	F.	6	„ 19	„ 17	„ 17	—	Coherent	—	—	Unvaccinated		—	—	1076
1927	2455 M. D.	F.	19	„ 19	„ 13	„ 14	June 19	Discrete	—	—	Inf.	3 foveate	6 weeks ago, not successful.	A few minute red papules at re-vaccination site.	1077
1928	3456 R. W. H.	M.	8	„ 19	„ 15	„ 18	„ 23	Discrete	—	—	Unvaccinated		—	—	1046
1929	— A. M. S.	F.	31	—	May 15	May 19	—	Mild	—	—	Inf.	—	20 years ago	A doubtful case. No trace of eruption when seen on June 20. Case not notified. Had podromata.	249
1930	3458 E. H.	M.	24	June 20	June 17	June 19	June 20	Discrete	—	—	Inf.	1 foveate	—	—	1079
1931	3457 H. F.	M.	3	„ 20	„ 17	„ 19	„ 20	Coherent	—	—	Unvaccinated		—	—	1080
1932	3460 E. C.	F.	41	„ 21	—	—	—	Mild	—	—	Inf.	—	—	—	1081
1933	3461 H. S.	F.	48	„ 22	—	—	—	Discrete	—	—	Inf.	4	—	—	1082
1934	3462 S. J.	F.	11	„ 22	June 19	June 21	—	Coherent	—	—	Aged 2	4 foveate	—	Papules of various sizes	1083
1935	3463 F. J. H.	M.	4	„ 22	„ 20	„ 22	—	Confluent	—	—	Unvaccinated		—	—	1046
1936	3464 S. J.	M.	26	„ 22	„ 19	„ 21	—	Discrete	—	—	Inf.	—	—	—	1084
1937	3466 A. G. H.	M.	11	„ 24	„ 20	„ 22	June 23	Confluent	—	—	Unvaccinated		—	—	1046
1938	3467 W. T.	M.	9	„ 24	„ 19	„ 21	—	Confluent	—	—	Unvaccinated		—	—	937
1939	3468 W. L. G.	M.	14	„ 24	—	—	—	Discrete	—	—	Inf.	1 foveate	—	—	1085
1940	3475 L. M. H.	M.	$\frac{18}{12}$	„ 27	June 21	June 24	—	Confluent	D.	July 4	Unvaccinated		—	Convulsions, June 23. Some hæmorrhage into skin.	1046
1941	3471 M. A. F.	F.	60	„ 25	„ 23	„ 26	June 27	Mild	—	—	Inf.	3 foveate	20 years ago, no result.	—	1086
1942	3472 F. H.	F.	15	„ 25	„ 24	„ 26	„ 27	Discrete	—	—	Inf.	4 foveate	—	—	1087
1943	3473 E. P.	F.	25	„ 25	„ 21	„ 24	—	Discrete	—	—	Inf.	—	—	—	1088
1944	3474 A. J. H.	M.	42	„ 26	„ 23	„ 25	—	Discrete	—	—	Inf.	—	—	—	1089

1945	3477	W. E. B.	M.	19	„ 27	„ 25	„ 27	June 28	Discrete	—	—	Inf.	4 foveate	—	——	1043
1946	3343	W. E. C.	M.	8	—	May 5	May 7	—	Coherent	—	—	Unvaccinated		—	——	1021
1947	3342	T. G. C.	M.	17	—	About May 20		—	Mild	—	—	Inf.	—	—	——	1021
1948	3344	E. J. C.	M.	11	—			—	Mild	—	—	Inf.	—	—	——	1021
1949	3478	M. C.	F.	25	June 27	June 22	June 26	—	Discrete	—	—	Inf.	4 foveate	—	——	1090
1950	3479	A. L.	M.	24	„ 27	„ 22	„ 24	—	Confluent	—	—	Inf.	—	—	——	1091
1951	3480	A. V.	F.	32	„ 27	„ 24	„ 26	June 28	Confluent	D.	July 12	Unvaccinated		—	Infantile vaccination failed	1092
1952	3481	R. C.	M.	19	„ 28	„ 23	„ 26	—	Discrete	—	—	Inf. 4	—	—	——	1093
1953	3484	J. M.	M.	60	„ 29	„ 26	„ 28	June 29	Confluent	D.	July 2	Inf.	—	—	——	850
1954	—	J. B.	M.	25	—	May 7	May 9	—	Discrete	—	—	Inf.	—	—	——	1094
1955	—	F. H.	F.	29	—	„ 5	„ 7	—	Mild	—	—	Inf.	—	—	A doubtful case	1095
1956	—	G. J.	M.	30	—	„ 5	„ 7	—	Mild	—	—	Inf.	—	—	See Nos. 155, 283	108
1957	—	T. R.	M.	37	—	Apr. 21	Apr. 23	—	Mild	—	—	Inf.	—	—	Father of No. 1056	599
1958	—	J. M.	F.	5	—	May 12	?	—	Mild ?	—	—	Inf.	1 foveate	—	A doubtful case. When seen by me, on June 28, no trace of eruption visible.	393
1959	3483	W. P.	M.	28	June 29	June 25	June 27	June 29	Confluent	—	—	Inf.	4 foveate	—	——	1096
1960	3485	L. F.	F.	42	„ 29	„ 26	„ 28	—	Coherent	—	—	Inf.	3 faint	—	Large full pustules	1097
1961	3486	F. A. R.	F.	6	„ 29	„ 25	„ 27	—	Coherent	—	—	Unvaccinated		—	Large pustules. Vaccination attempted two months ago, but failed, only linear scratches visible.	1098
1962	3487	E. F.	F.	50	„ 30	„ 22	„ 24	—	Discrete	—	—	Inf.	—	—	Large pustules	1078
1963	3490	H. M.	M.	14	„ 30	„ 28	„ 30	—	Mild	—	—	Inf.	4 foveate	End of March	One slight scar	1025
1964	3491	A. W.	M.	45	July 1	„ 23	„ 25	—	Mild	—	—	Inf.	4 foveate, small.	Attempted 2 months ago, failed.	A small linear scar at site of attempted re-vaccination.	1099
1965	3492	A. T.	F.	42	„ 1	„ 28	„ 29	—	Mild	—	—	Inf.	3 foveate	20 years ago; no result.	——	1100
1966	3493	J. M.	M.	4	„ 1	„ 30	July 1	July 2	Coherent	—	—	Unvaccinated		—	Fine multiform rash	1101
1967	3494	M. D.	F.	45	„ 3	„ 29	„ 1	„ 2	Mild	—	—	Aged 8	3 marks	—	Mother of No. 1930	1077
1968	3495	A. F.	F.	19	„ 3	July 1	„ 2	„ 3	Confluent	—	—	Inf.	4 very faint.	—	——	1101
1969	3496	M. A. M.	F.	46	„ 3	„ 1	„ 2	„ 3	Confluent	D.	July 8	Unvaccinated		—	Delirium	1068
1970	3498	W. T. S.	M.	28	„ 7	—	—	—	Mild	—	—	Inf.	2 large scarred.	—	——	1102
1971	3502	E. W.	F.	22	„ 11	July 9	July 10	July 11	Mild	—	—	Inf.	1 foveate	—	——	850
1972	3506	A. L.	F.	56	„ 14	—	—	—	Mild	—	—	Inf.	—	—	——	1091
1973	3510	A. H.	F.	38	„ 15	July 11	July 14	July 15	Mild	—	—	Inf.	3 scars	—	——	1103
1974	3512	H. H.	M.	26	„ 15	„ 13	„ 15	„ 15	Discrete	—	—	Inf.	4 foveate	—	——	1104
1975	3514	H. H.	M.	28	„ 17	„ 12	„ 15	„ 17	Malignant	D.	July 21	Inf.	2 scars	—	——	1105
1976	3277	E. M.	F.	$\frac{5}{12}$	May 21	May 19	„ 21	—	Discrete	—	—	Unvaccinated		—	Child of No. 1778 and notified on same day; omitted in error.	998
1977	1463	F. P.	M.	50	Jan. 23	?	?	Jan. 23	Mild	—	—	Inf.	—	—	Notified from Ship "Hero." Father of Nos. 60 and 84; omitted above in error.	41
1978	3516	H. M.	F.	60	July 18	July 13	July 15	„ 18	Coherent	—	—	Inf.	4 faint	—	——	850
1979	3517	S. A. P.	F.	64	„ 20	„ 16	„ 18	„ 20	Confluent	D.	July 24	Inf.	—	—	——	1099

§ 10. SCHOOL INFLUENCE AS A FACTOR IN THE SPREAD OF THE DISEASE.

The remarkable outburst of the small-pox in the month of February was, as has already been intimated, due to the fact that two of the largest public elementary schools in Gloucester became centres of infection, viz., the Widden Street Board School and St. Luke's School in New Street. Situated in opposite quarters of the town, where cases of small-pox had already occurred, the dissemination of the disease in these neighbourhoods, through the medium of the school children, became at once strikingly manifested.

Widden Street Board School.

This school is situated between Widden Street, Napier Street, and Sinope Street, at the northern boundary of the south hamlet. At the beginning of the year there were on the books: boys, 276; girls, 276; infants, 242.

During 1895 five of the children attending this school had been attacked with small-pox, but there is no ground for believing that they were infected in the school. They are: boys (No. 34), girls (Nos. 8, 25), infants (Nos. 10, 35).

The school was closed by order of the Sanitary Authority on February 21st, there having been notified several cases of small-pox amongst the children attending the infant school. From the commencement of the year until the 7th of March, these notifications (of children the first to be attacked in their respective families) numbered as follows, on the days given :—

February 15	- 1	February 19	- 8	February 25	- 1
„ 16	- 3	„ 20	- 6	March 7	- 1
„ 17	- 7	„ 21	- 8	April 4	- 1
„ 18	- 4	„ 22	- 5	1 not notified (No. 222).	

All of these were in the infant school.

CASES of SMALL-POX amongst Children attending the Widden Street Board School (Infants), notified between February 13th and March 7th, 1896.

Reference No.	Name.	Age.	Notification.	Onset.	Last Day of School Attendance.	Result.	Other Cases in House.	Reference to House List.
102	R. P.	5	Feb. 13	Feb. 11	Jan. 31	D.	Nos. 78, 108, 127	47
107	A. H.	5	„ 15	„ 12	?	—	—	70
112	W. H.	3	„ 16	„ 14	?	D.	—	74
113	A. S.	6	„ 16	„ 13	Feb. 12	D.	—	75
116	F. M.	5	„ 16	„ 14	?	D.	No. 238	77
117	W. E.	4	„ 17	„ 14	„ 12	—	No. 224	78
119	L. D.	5	„ 17	„ 15	„ 13	—	—	80
120	A. H.	5	„ 17	„ 15	„ 12	D.	No. 1,845	81
121	W. H. A.	5	„ 17	„ 14	„ 12	—	No. 232	82
122	A. T.	5	„ 17	„ 14	„ 14	—	Nos. 216, 217	83
123	A. O.	6	„ 17	„ 15	„ 13	—	—	84
124	W. C.	5	„ 17	„ 14	„ 13	D.	—	85
125	G. J.	6	„ 18	„ 14	„ 13	—	—	86
128	R. J.	7	„ 18	„ 13	„ 14	—	Nos. 647, 1,128	87
129	L. J.	5	„ 18	„ 13	„ 14	—		87
130	C. M.	6	„ 18	„ 14	„ 14	—	—	88
132	C. L.	5	„ 19	„ 17	?	D.	No. 267	90
131	A. N.	6	„ 19	„ 14	„ 14	—	No. 247	89
133	O. N.	3	„ 19	„ 14	„ 14	—		89
134	E. C.	5	„ 19	„ 17	„ 13	D.	—	91
135	F. B.	6	„ 19	„ 16	„ 13	D.	Nos. 234, 235, 236, 259, 260, 265, 266, 268, 314, 429.	94
138	W. W.	5	„ 19	„ 16	„ 14	—	—	95
139	A. A.	4	„ 19	„ 17	„ 14	D.	Nos. 230, 567, 991, 993	96
142	E. B.	6	„ 19	„ 8	„ 16	—	No. 341	97
144	B. S.	5	„ 20	„ 14	„ 14	—	Nos. 241, 242, 257, 258	98
145	S. A.	5	„ 20	„ 18	„ 13	—	Nos. 245, 246, 351	99
146	W. K.	5	„ 20	„ 15	„ 12	D.	—	100
148	C. T.	5	„ 20	„ 16	?	—	No. 1,214	102
151	G. B.	5	„ 20	„ 18	?	D.	No. 152	105
153	J. H.	3	„ 20	„ 14	„ 14	D.	Nos. 274, 284	106
155	J. J.	5	„ 21	„ 17	„ 17	D.	Nos. 283, 1,956	108
156	V. E. H.	7	„ 21	„ 16	„ 7	D.	Nos. 255, 256	109

Reference No.	Name.	Age.	Notification.	Onset.	Last Day of School Attendance.	Result.	Other Cases in House.	Reference to House List.
157	A. C.	6	Feb. 21	Feb. 14	Feb. 14	—	No. 303 - - -	110
158	E. B.	6	„ 21	„ 14	„ 14	—	——	111
159	W. R. T.	5	„ 21	„ 17	„ 17	D.	Nos. 291, 466, 479, 643, 644.	113
161	M. H.	6	„ 21	„ 19	„ 19	D.	——	114
162	A. G.	5	„ 21	„ 18	?	D.	——	115
163	V. M.	4	„ 21	„ 17	„ 17	—	Nos. 575, 576, 737 -	116
164	D. P.	5	„ 22	„ 16	„ 14	—	Nos. 243, 582, 583 -	117
165	R. P.	5	„ 22	„ 18	„ 17	—	Nos. 414, 415 - -	118
166	W. R.	5	„ 22	„ 17	„ 14	D.	Nos. 286, 584 - -	119
167	W. A.	5	„ 22	„ 17	„ 17	—	No. 278 - - -	120
171	H. S.	5	„ 22	„ 18	„ 18	—	Nos. 440, 747, 873, 874 -	123
183	T. R.	6	„ 25	„ 19	„ 20	—	Nos. 591, 836 - -	131
222	W. C.	4	—	„ 14	„ 19	D.	No. 221 - - -	163
293	W. G.	6	Mar. 7	„ 5	?	—	——	198
839	M. L.	6	April 4	Mar. 6	„ 14	—	No. 838 - -	472

Thus 47 children attending the infant school at Widden Street were attacked with small-pox from the second week in February to the first week in March; the greater number of cases being notified from the 16th to the 22nd (inclusive) viz., 41. In 46 instances the child was the first member of its family to be attacked. The exception to this is the child who heads the list, who last attended the school on January 31st, the day on which her mother (No. 78) was declared to be suffering from small-pox. It is quite possible that it was through this child that the disease was introduced into the school. She died, and so did no fewer than 19 out of the 46 attacked subsequently. The case mortality amongst the children in this infant school was, therefore, 44·4 per cent. In the 44 households to which these children (except (No. 102) belonged, 65 cases of small-pox subsequently arose, in two instances, viz., Houses 81 and 102, after a long interval—so long as to raise doubts whether the later case was directly connected with the initial one. It may be remarked that the 111 cases of small-pox thereby accounted for were thus distributed:—

In 15 houses, 1 case	- 15	Initial, 15	- 7 deaths.		
12 „ 2 cases	- 24	„ 12	- 5 „	Later, 12	- 2 deaths.
8 „ 3 „	- 24	„ 9	- 4 „	„ 15	- 5 „
4 „ 4 „	- 16	„ 5	- 0 „	„ 11	- 0 „
3 „ 5 „	- 15	„ 3	- 1 „	„ 12	- 1 „
1 „ 6 „	- 6	„ 1	- 1 „	„ 5	- 2 „
1 „ 11 „	- 11	„ 1	- 1 „	„ 10	- 3 „
44	111	46	- 19	65	- 13

It will be observed that the mortality amongst the "later" cases in the houses infected by these school children was 19·3 per cent., whereas amongst the children themselves it was 44·4 per cent. This may be compared with the age-incidence of the disease in these households.

Age.	Initial.		Later.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Under 1 year - - -	—	—	3	3	3	3
1 to 10 years - - -	46	19	24	6	70	25
10 to 30 „ - - -	—	—	24	1	24	1
30 and over - - -	—	—	14	3	14	3
	46	19	65	13	111	32

All the children attacked were unvaccinated, and the vaccination conditions of the 65 persons subsequently falling ill in the houses whence they came was as follows :—

Age.	Vaccinated.		Unvaccinated.		"Under" Vaccination.		"Alleged" Vaccination.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Under 1 year	—	—	3	3	—	—	—	—
1 to 10 years	—	—	24	6	1	—	—	—
10 to 30 „	22	—	—	—	—	—	1	—
30 and over	12	3	1	1	—	—	1	—
	34	3	28	10	1	—	2	—

One of the teachers (L. W., No. 110) in the infant school contracted small-pox at the same time as the children, her case being notified on February 16.

Of the teachers, those in the boys' school were re-vaccinated when it was closed, except one, who had been re-vaccinated in January; in the girls' school, seven re-vaccinated in January, four while the school was closed; in the infants' school, six re-vaccinated in January, two in February. The teacher attacked with small-pox had not been re-vaccinated.

St. Luke's School (*New Street*).

This school is situated at the western extremity of New Street, in which there had been two houses invaded by small-pox in January. This street was destined to be one of the chief foci of the disease, and the school children were doubtless largely the source whereby it was infected.

None of the teachers in this school were attacked with small-pox.

Cases of Small-Pox amongst Children attending St. Luke's School (New Street) notified between February 24th and March 16th, 1896.

Reference No.	Name.	Age.	Notification.	Onset.	Last Day of School Attendance.	Result.	Other Cases in House.	Reference to House List.
				Boys.				
289	F. M.	12	Mar. 7	Mar. 1	Feb. 28	—	Nos. 534, 624, 665, 666 -	195
359	H. H.	6	„ 11	„ 8	„ 28	—	Nos. 729, 786 - -	237
396	H. D.	8	„ 13	„ 7	„ 28	—	Nos. 716, 718, 719 -	266
444	T. B.	11	„ 15	„ 13	„ 28	—	Nos. 728, 731 - -	293
				Girls.				
366	L. T.	8	Mar. 11	Mar. 7	Feb. 28	—	No. 662 - -	242
455	M. G.	6	„ 16	„ 14	„ 28	—	Nos. 454, 456, 457 -	299
				Infants.				
174	L. K.	5	Feb. 24	Feb. 19	Feb. 20	D.	Nos. 820, 827, 1142, 1247	125
176	C. W.	5	„ 24	„ 19	„ 20	D.	——	126
178	W. H.	6	„ 24	„ 20	„ 21	D.	——	127
182	A. H.	3	„ 25	„ 23	„ 21	—	——	130
185	O. B.	4	„ 25	„ 19	„ 19	—	No. 318 - - -	132
186	F. B.	3	„ 25	„ 19	„ 21	D.	No. 301 - - -	133
188	F. B.	4	„ 26	„ 19	„ 21	D.	——	135
189	T. R.	5	„ 26	„ 20	„ 21	D.	Nos. 323, 324, 325, 327, 400, 401.	136
190	E. R.	5	„ 26	„ 20	„ 21	D.	——	137
191	R. W.	4	„ 26	„ 23	„ 21	—	No. 390 - -	138
192	W. H.	5	„ 26	„ 24	„ 21	D.	——	139
193	R. N.	4	„ 26	„ 18	„ 21	D.	Nos. 364, 365, 384, 413, 693, 694, 1161.	140
194	E. G.	3	„ 27	„ 24	„ 21	D.	Nos. 340, 354, 791 -	142
195	W. S.	3	„ 27	„ 22	„ 21	—	Nos. 378, 380, 382, 1121	143

Reference No.	Name.	Age.	Notification.	Onset.	Last Day of School Attendance.	Result.	Other Cases in House.	Reference to House List.
197	L. B.	5	Feb. 26	Feb. 19	Feb. 21	D.	——	141
198	W. C.	4	„ 27	„ 21	„ 21	D.	——	144
200	A. C.	5	„ 27	„ 20	?	—	Nos. 355, 319, 437, 673 -	146
201	E. C.	4	„ 27	„ 22	„ 21	D.	No. 199 - - -	145
204	A. C.	5	„ 28	„ 25	„ 21	D.	Nos. 422, 423 - -	149
207	S. A.	6	„ 28	„ 21	„ 21	D.	Nos. 421, 439 - -	152
208	G. S.	3	„ 28	„ 25	„ 21	—	——	153
211	L. S.	5	„ 28	„ 25	„ 17	—	——	155
212	F. E.	4	„ 28	„ 24	„ 26	D.	No. 403 - - -	156
215	L. C.	6	„ 29	„ 22	„ 24	D.	Nos. 498, 499 - -	159
219	E. W.	4	„ 29	„ 26	„ 26	D.	Nos. 698, 953, 954 -	161
220	A. M.	3	„ 29	„ 25	„ 14	—	——	162
225	I. H.	4	Mar. 1	„ 25	„ 21	D.	No. 528 - - -	165
226	G. H.	6	„ 1	„ 25	„ 25	—		
229	M. S.	4	„ 2	„ 27	„ 27	—	No. 446 - - -	168
237	E. N.	4	„ 2	„ 27	„ 24	—	Nos. 462, 463, 464, 721, 758.	170
240	L. H.	7	„ 3	Mar. 1	„ 28	—	Nos. 480, 856 - -	171
269	A. R.	4	„ 6	Feb. 26	„ 26	—	Nos. 552, 1169 - -	181
304	L. M.	4	„ 8	Mar. 6	„ 27	—	Nos. 328, 329 - -	207
450	P. P.	7	„ 16	„ 13	„ 24	—	Nos. 752, 916, 955 -	297

Thus, between the dates February 24th and March 16th, there were attacked 40 children in this school (boys 4, girls 2, infants 34). Prior to this time there had been one case among the boys, viz., W. B., aged 9 (No. 180), whose illness was notified on February 25th, and who came from an infected house (No. 58). Amongst the girls there had been two cases, viz., F. L., aged 8 (No. 42), notified on January 9th; she came from house No. 29, and was taken ill, together with her mother (No. 41). A third case (No. 61) was notified from this house on January 21st. The other child in the girls' school was G. P., aged 9 (No. 87), notified on February 3rd; two other cases subsequently arose in her house (No. 54), viz., M. P., aged 40 (No. 140) and E. B., aged 25 (No. 141), both notified on February 19th. There do not appear to have been any cases amongst the infants prior to February 24th.

The school was closed by order of the Sanitary Authority on February 28th.

The fatalities were confined to those attacked amongst the infants, of whom 19 out of 34 died, a case-mortality of 55·8 per cent.

In the 39 households to which these children belonged 72 cases of small-pox subsequently arose, of whom 16 died, a case-mortality of 22·2 per cent.

The 107 cases were distributed in houses as follows:—

In 11 houses,	1 case	- 11	Initial, 11 - 7 deaths.	
7 „	2 cases	- 14	„ 7 - 3 „	Later, 7 - 3 deaths.
9 „	3 „	- 27	„ 10 - 4 „	„ 17 - 3 „
5 „	4 „	- 20	„ 5 - 2 „	„ 15 - 3 „
4 „	5 „	- 20	„ 4 - 1 „	„ 16 - 3 „
1 „	6 „	- 6	„ 1 - 0 „	„ 5 - 2 „
1 „	7 „	- 7	„ 1 - 1 „	„ 6 - 2 „
1 „	8 „	- 8	„ 1 - 1 „	„ 7 - 0 „
39		113	40 - 19	73 - 16

Classified according to age these cases are distributed:—

Age.	Initial.		Later.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Under 1 year - - -	—	—	9	7	9	7
1 to 10 years - - -	38	19	31	5	69	24
10 to 30 „ - - -	2	—	18	2	20	2
30 and over - - -	—	—	15	2	15	2
	40	19	73	16	113	35

Of the 40 children, 38 were unvaccinated, one (No. 444, aged 11) vaccinated, and one (No. 201, aged 4) was "under" vaccination. Of the 73 subsequent cases :—

Age.	Vaccinated.		Unvaccinated.		"Under" Vaccination.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Under 1 year	—	—	8	6	1	1
1 to 10 years	—	—	26	4	5	1
10 to 30 „	17	2	1	—	—	—
30 and over	14	1	1	1	—	—
	31	3	36	11	6	2

Board Schools, Tredworth Road.

These schools are large, commodious, and of comparatively recent construction, situated at the junction of the main Tredworth Road and High Street.

There is less to support the view that the children attending this school were infected there than in the case of the Widden Street and New Street Schools; but it will be seen from the annexed list that several were attacked whilst in attendance, or shortly after the schools were closed. In each instance only those children are indicated who were the first to be attacked in their families. There were several others amongst those attending the school who were obviously infected at their own homes, and it is not unlikely that some of these may have imported the disease into the school.

A pupil teacher (L. F. R., No. 1,054) at this school was attacked by small-pox on April 3rd, *i.e.*, 14 days from the date at which the school was closed.

CASES of SMALL-POX amongst Children attending Tredworth Road Board Schools, notified between February 25th and March 31st, 1896.

Reference No.	Name.	Sex.	Age.	Notification.	Onset.	Last Day of School Attendance.	Result.	Other Cases in House.	Reference to House List.
					BOY.				
459	D. C.	M.	6	Mar. 16	Mar. 12	Mar. 12	D.	Nos. 738, 776, 777, 796	301
495	L. B.	M.	7	„ 17	„ 12	„ 13	—	Nos. 892, 893, 894, 1,123.	324
787	B. M.	M.	9	„ 30	„ 22	?	—	Nos. 789, 790, 792, 831	452
					GIRLS.				
407	F. B.	F.	5	„ 13	„ 9	Mar. 9	—	No. 686	271
529	E. P.	F.	8	„ 19	„ 13	„ 6	—	Nos. 842, 1,369	342
578	B. T.	F.	9	„ 21	„ 14	?	—	Nos. 882, 1,079, 1,080	369
677	R. H.	F.	11	„ 26	„ 22	?	—	Nos. 733, 1,249	371
681	F. A.	F.	6	„ 26	„ 24	?	D.	——	408
683	B. A.	F.	7	„ 26	„ 23	?	—	Nos. 692, 1,111, 1,184, 1,185, 1,270, 1,331.	409
684	C. P.	F.	7	„ 26	„ 23	?	D.	Nos. 1,145, 1,266	410
702	A. S.	F.	8	„ 27	„ 23	?	—	——	416
712	E. B.	F.	7	„ 27	„ 25	?	—	Nos. 1,053, 1,151, 1,159 1,524.	420
746	G. S.	F.	6	„ 29	„ 25	?	D.	Nos. 1,146, 1,252	429
778	C. P.	F.	7	„ 30	„ 22	?	—	——	446
814	R. H.	F.	10	„ 31	„ 28	?	—	Nos. 1,271, 1,581, 1,582	466
					INFANTS.				
181	H. S.	M.	3	Feb. 25	Feb. 23	Feb. 24	—	Nos. 346, 451, 452, 672	129
288	A. S.	M.	4	Mar. 7	Mar. 5	Mar. 6	D.	Nos. 537, 538, 539, 540, 541, 542, 585, 669.	194
305	E. J.	F.	3	„ 8	„ 2	?	D.	——	208
482	A. M.	M.	4	„ 17	„ 12	„ 13	—	——	314
489	A. J.	F.	6	„ 17	„ 13	?	—	——	321
518	K. K.	F.	6	„ 19	„ 12	„ 12	D.	Nos. 868, 871, 1,089	337
774	L. M.	F.	5	„ 30	„ 26	?	D.	Nos. 536, 840, 917, 1,226, 1,227.	444

Thus, from February 25th to March 31st, there were (apparently) attacked in this school 22 children (boys, 3; girls, 12; infants, 7).

The school was closed by order of the Sanitary Authority on March 20th.

The deaths were 8 in number (boys, 1; girls, 3; infants, 4), a case mortality of 36·3 per cent.

In the 22 households to which these children belonged, 57 cases of small-pox subsequently arose, of which 13 died, a case mortality of 22·8 per cent.

The total (79) cases were distributed in houses as follows:—

In 6 houses,	1 case	- 6	Initial, 6 - 2 deaths.	
1 ,,	2 cases	- 2	,, 1 - 0 ,,	Later, 1 - 0 death.
4 ,,	3 ,,	- 12	,, 4 - 2 ,,	,, 8 - 1 ,,
3 ,,	4 ,,	- 12	,, 3 - 1 ,,	,, 9 - 2 ,,
5 ,,	5 ,,	- 25	,, 5 - 1 ,,	,, 20 - 4 ,,
1 ,,	6 ,,	- 6	,, 1 - 1 ,,	,, 5 - 1 ,,
1 ,,	7 ,,	- 7	,, 1 - 0 ,,	,, 6 - 1 ,,
1 ,,	9 ,,	- 9	,, 1 - 1 ,,	,, 8 - 4 ,,
22		79	22 - 8	57 - 13

Classified according to age:—

Age.	Initial.		Later.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Under 1 year - - -	—	—	5	3	5	3
1 to 10 years - - -	20	8	19	7	39	15
10 to 30 ,, - - -	2	—	13	1	15	1
30 and over - - -	—	—	20	2	20	2
	22	8	57	13	79	21

Of the 22 children, two were vaccinated, 19 unvaccinated, and one was "under" vaccination when attacked. Of the 57 "later" cases there were:—

Age.	Vaccinated.		Unvaccinated.		"Under" Vaccination.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Under 1 year - -	—	—	5	3	—	—	5	3
1 to 10 years - - -	3	—	12	6	4	1	19	7
10 to 30 ,, - -	13	1	—	—	—	—	13	1
30 and over - - -	19	2	1	—	—	—	20	2
	35	3	18	9	4	1	57	13

Board Schools, Linden Road.

These are large, handsome buildings standing on open ground to the south of the city, and adjoining the site of the Infectious Diseases Hospital.

In the course of the epidemic many of the pupils were attacked with small-pox; but amongst those primarily infected, and within a period which might cause their possible infection at the school, only 12 can be named.

CASES of SMALL-POX amongst Children attending the Linden Road Board School, notified between February 7th and March 31st, 1896.

Reference No.	Name.	Sex.	Age.	Notification.	Onset.	Last Day of School Attendance.	Result.	Other Cases in House.	Reference to House List.
					MIXED.				
96	H. M.	M.	7	Feb. 7	Feb. 2	Jan. 31	—	Nos. 492, 493, 494, 501, 1,094.	64
218	W. R.	M.	8	,, 29	,, 16	Feb. 28	—	——	160
250	E. V.	F.	7	Mar. 4	Mar. 1	,, 26	—	——	175
280	A. L.	M.	8	,, 6	,, 3	Mar. 2	D.	Nos. *511*, *512*, 513, *515*.	189
316	W. H. P.	M.	8	,, 9	,, 3	,, 4	—	No. 648 - -	216
411	T. E.	M.	7	,, 13	,, 11	Feb. 21	—	Nos. 543, 793 -	275
616	G. W.	F.	12	,, 23	,, 22	Mar. 13	—	Nos. 618, 867, 963, 964, 965.	389
757	C. H.	M.	12	,, 29	,, 28	,, 10	—	Nos. 1,143, 1,144, *1,257*, *1‘288*.	434
795	G. L.	F.	8	,, 31	,, 26	,, 6	—	No. 798 - -	454
812	K. L.	F.	9	,, 31	,, 28	,, 13	—	Nos. *843*, 1,175, 1,176, 1,289, 1,290.	464
					INFANTS.				
484	A. P.	M.	4	Mar. 17	Mar. 4	Mar. 4	D.	Nos. *642*, 649, 650, *829*, 830.	316
640	T. P.	M.	5	,, 24	,, 18	Feb. 28	—	Nos. 641, *736*, 832, 833.	397

In addition to the foregoing there was notified on February 19th the case of A.G., aged 14 (No. 137.), living at the school. She may have been infected by No. 96, and possibly was herself the source of infection of Nos. 250 and 316. Her attack was an extremely mild one.

It will be seen that the cases notified amongst children attending this school between February 7th and March 31st were 12 in number, but this does not include several others who were not the first to fall ill in their homes.

The school was closed by order of the Sanitary Authority on March 13th.

There were two deaths, a case mortality of 16·6 per cent.

In the 12 households to which these children belonged there arose 36 cases subsequently, of whom nine died, or 25 per cent.

The 48 cases were distributed as follows:—

In 2 houses,	1 case	- 2	Initial, 2 - 0 death.	
2 ,,	2 ,,	- 4	,, 2 - 0 ,,	Later, 2 - 0 deaths.
1 ,,	3 ,,	- 3	,, 1 - 0 ,,	,, 2 - 0 ,,
3 ,,	5 ,,	- 15	,, 3 - 1 ,,	,, 12 - 6 ,,
4 ,,	6 ,,	- 24	,, 4 - 1 ,,	,, 20 - 3 ,,
12		48	12 - 2	36 - 9

Classified according to age:—

Age.	Initial.		Later.		All.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Under 1 year - - -	—	—	2	2	2	2
1 to 10 years - - - -	10	2	23	6	33	8
10 to 30 ,, - -	2	—	7	1	9	1
30 and over - - - -	—	—	4	—	4	—
	12	2	36	9	48	11

Of the 12 children, two were vaccinated, 10 unvaccinated, whilst the 36 others were :—

Age.	Vaccinated and Alleged.		Unvaccinated.		"Under" Vaccination.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Under 1 year	—	—	1	1	1	1	2	2
1 to 10 years	5	—	15	5	3	1	23	6
10 to 30 ,,	6	1	—	—	1	—	7	1
30 and over	4	—	—	—	—	—	4	—
	15	1	16	6	5	2	36	9

Rycroft Street Schools (*Wesleyan*).

These schools, which are not board schools, are situated at the junction of Rycroft and Conduit Streets.

There were many cases of small-pox amongst the children or in their homes, but in only nine instances were these children the first of their families to be attacked during the period when they might reasonably be supposed to have been infected at the school.

No teacher contracted the disease.

CASES of SMALL-POX amongst Children attending the Rycroft Street Schools, notified between February 28th and March 25th, 1896.

Reference No.	Name.	Sex.	Age.	Notification.	Onset.	Last Day of School Attendance.	Result.	Other Cases in House.	Reference to House List.
					MIXED.				
233	J. G.	M.	11	Mar. 2	Feb. 28	Feb. 20	—	——	169
487	G. C.	F.	9	,, 17	Mar. 12	Mar. 9	—	——	319
507	A. P.	M.	12	,, 18	,, 15	,, 9	—	Nos. 760, 900, 901, 902.	332
589	C. D.	F.	10	,, 21	,, 18	,, 9	—	——	372
663	E. B.	F.	10	,, 25	,, 23	,, 9	D.	No. 664 -	403
					INFANTS.				
206	A. C.	M.	4	Feb. 28	Feb. 25	?	D.	Nos. 310, 335, 339, 424, 425, 426.	151
248	P. W.	M.	7	Mar. 4	,, 29	Feb. 28	—	——	173
376	V. P.	F.	5	,, 11	Mar. 1	?	D.	Nos. 605, 697, 708	252
606	M. B.	F.	4	,, 23	,, 20	Mar. 9	D.	——	383

From February 28th to March 25th there were notified nine cases (primary) of small-pox amongst children in this school (mixed class 5, infants 4). There were four deaths (mixed 1, infants 3) a case mortality of 44·4 per cent.

The school was closed by order of the Sanitary Authority on March 9th, hence it is improbable for at least three of the above children to have contracted the disease at the school, if indeed any of them did ; there is no evidence on the point.

In the nine households to which these children belonged 14 other cases subsequently occurred, seven being fatal, or 50 per cent.

The 23 cases were thus distributed :—

In 5 houses, 1 case	- 5	Initial, 5 - 1 death.	
1 ,, 2 ,,	- 2	,, 1 - 1 ,,	Later 1 - 1 death.
1 ,, 4 ,,	- 4	,, 1 - 1 ,,	,, 3 - 0 ,,
1 ,, 5 ,,	- 5	,, 1 - 0 ,,	,, 4 - 1 ,,
1 ,, 7 ,,	- 7	,, 1 1 ,,	,, 6 - 5 ,,
9	23	9 - 4	14 - 7

Classified according to age :—

Age.	Initial.		Later.		All.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Under 1 year -	—	—	—	—	—	—
1 to 10 years - -	5	3	8	4	13	7
10 to 30 „ - -	4	1	2	1	6	2
30 and over - -	—	—	4	2	4	2
	9	4	14	7	23	11

Of the nine children, seven were unvaccinated, and two were "under" vaccination when attacked, whilst the 14 "later" cases were thus distributed.

Age.	Vaccinated.		Un-vaccinated.	
	Cases.	Deaths.	Cases.	Deaths.
1 to 10 years -	—	—	8	4
10 to 30 „ - -	—	—	2	1
30 and over - -	4	2	—	—
	4	2	10	5

Summarising these data, in order to arrive at an approximate idea of the extent to which school infection was responsible for the spread of the disease, it appears that during a period of 7 weeks and 3 days, *i.e.*, 52 days, ending March 31st, during which the total number of cases notified amounted to 415, there were 126 proceeding from these schools who (with more or less presumption) may be assumed to have been infected therein.

These 415 cases came from 398 houses, in which 469 cases subsequently arose.

The 126 children came from 123 houses, in which 231 cases subsequently arose.

So that of a total of 984 persons attacked there were 357, or 36·2 per cent., who may have been directly or indirectly infected through children attending the elementary schools.

The subjoined tabular statements embody the facts from which this inference is drawn. The figures are, however, only approximate, as they are based on the dates of *notification*, and not of the first appearance of small-pox in the house.

HOUSES INVADED BY SMALL-POX.

Initial Cases in Children attending School.	Feb. 9 to 15.	Feb. 15 to 22.	Feb. 23 to 29.	Mar. 1 to 7.	Mar. 8 to 14.	Mar. 15 to 21.	Mar. 22 to 28.	Mar. 29 to 31.	Total.
Widden Street -	1	39	2	2	—	—	—	—	44
St. Luke's - -	—	—	26	6	4	3	—	—	39
Tredworth - -	—	—	1	1	2	7	6	5	22
Linden Road -	—	—	1	2	2	1	2	3	11
Ryecroft - -	—	—	1	2	1	3	2	—	9
	1	39	31	13	9	14	10	8	125
Other sources -	3	13	10	28	68	71	43	37	273
TOTAL - -	4	52	41	41	77	85	53	45	398

ATTACKED BY SMALL-POX.

Cases in Children attending School.	Feb. 9 to 15.	Feb. 15 to 22.	Feb. 23 to 29.	Mar. 1 to 7.	Mar. 8 to 14.	Mar. 15 to 21.	Mar. 22 to 28.	Mar. 29 to 31.	Total.
					INITIAL.				
Widden Street -	1	42	2	2	—	—	—	—	47
St. Luke's - -	—	—	26	7	4	3	—	—	40
Tredworth - -	—	—	1	1	2	7	6	5	22
Linden Road -	—	—	1	2	2	1	2	3	11
Ryecroft - -	—	—	1	2	1	3	2	—	9
	1	42	31	14	9	14	10	8	129
Other sources -	3	12	10	28	68	74	49	42	286
TOTAL - -	4	54	41	42	77	88	59	50	415
					LATER.				
Widden Street -	—	61	3	1	—	—	—	—	65
St. Luke's - -	—	—	42	15	8	8	—	—	73
Tredworth - -	—	—	4	8	1	16	14	14	57
Linden Road -	—	—	—	4	3	5	9	10	31
Ryecroft - -	—	—	6	—	3	4	1	—	14
	—	61	55	28	15	33	24	24	240
Other sources -	3	14	4	13	81	62	34	18	229
TOTAL - -	3	75	59	41	96	95	58	42	469

Lastly, the marked preponderance of children attacked during this period is obviously due to this invasion of the schools. For of the 415 " initial " cases notified, 160 were in subjects between 1 and 10 years of age, of whom 116 were apparently infected at school. Indeed, of the 98 subjects in this age-period, whose attacks were notified in the five weeks, February 9th to March 14th, no fewer than 91 were these school children.

Isolated cases also occurred amongst the children attending other of the public elementary schools of the city prior to the date of their being closed. The following is a list, kindly furnished by Mr. P. B. Cooke, assistant clerk to the school board, of these schools, and the dates of their closure:—

1. Widden Street - - -	Closed	February	21.
2. St. James's - - -	,,	,,	28.
3. St. Luke's - - -	,,	,,	28.
4. Ryecroft - - - -	,,	March	6.
5. Linden Road - - -	,,	,,	13.
6. British - - - -	,,	,,	13.
7. St. Michael's - - -	,,	,,	13.
8. Northgate (Wesleyan) - -	,,	,,	20.
9. Tredworth - - -	,,	,,	20.
10. Deacon Street - - -	,,	April	1.
11. National - - -	,,	,,	1.
12. St. Peter's (Roman Catholic) -	,,	,,	1.
13. St. Catharine's - - -	,,	,,	1.
14. St. Mark's - - -	,,	,,	1.
15. St. Mary de Lode - -	,,	,,	1.

All of these schools were re-opened on June 1st.

As regards the manner in which the Widden Street and St. Luke's schools became infected, there can only be made suggestions in the absence of positive proof. Thus:—

(*a.*) A child attended the infant school of Widden Street on January 31st, the day on which its mother (No. 78) was removed to hospital suffering from small-pox. This or analogous methods of transference of the contagion seems the most probable suggestion.

(*b.*) Classes for pupil teachers of the various elementary public schools are held in the evening at Widden Street; and it is possible that the contagion was introduced by that medium.

(*c.*) On Sundays the schools are handed over to others, and the children attending these Sunday schools include many who are not in daily attendance. It is possible that the contagion was introduced through one or other of them.

It is difficult after the lapse of two months to trace out the links of infection; one thing, however, is certain, that the current belief that the infant school at Widden Street was infected through one of the teachers contracting small-pox is not correct, since she was taken ill at the same time as the children were. Nor is there anything to substantiate another suggestion, as to the introduction of the disease by persons employed at the schools.

After all, with small-pox prevalent in the vicinity, and amongst the houses from which the children came, it is not surprising that the schools were infected. It would indeed have been more remarkable had they escaped such infection, under the special circumstances of this outbreak.

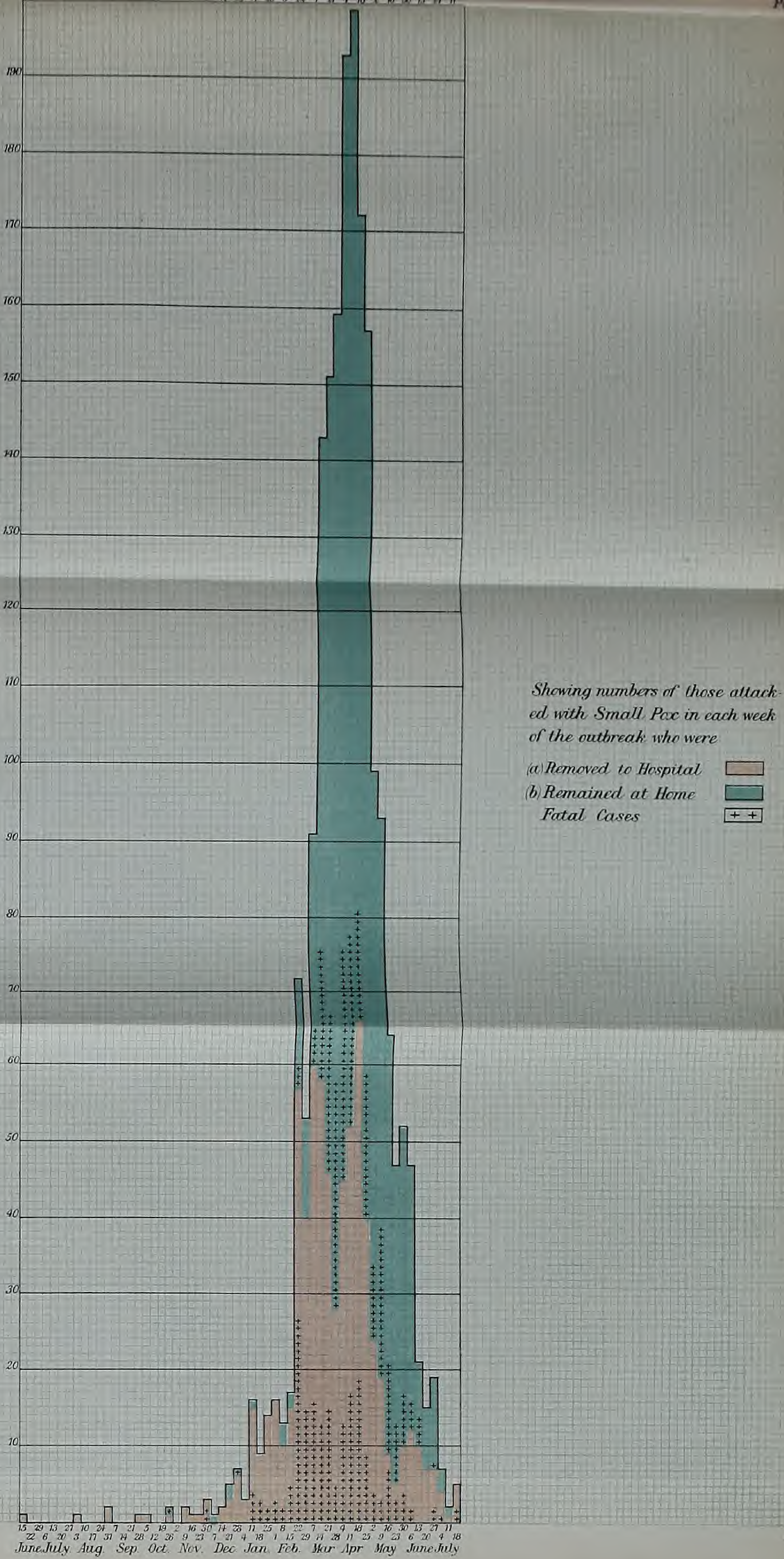
§ 11. HOSPITAL ISOLATION.

Throughout the 30 weeks of 1895, and until the third week in February 1896, practically every case of small-pox was removed to the Stroud Road Hospital on the day that it was notified to the authorities. There are a few cases which were not known at the time that were not so removed. But from this date onwards, and with increasing numbers throughout the ensuing weeks, cases had to be left at their homes, whilst, when in the month of April, the hospital accommodation had been extended so that it would have been possible to have isolated every case, the majority declined to be removed, some of them requiring to be compelled by magistrates' orders, others resisting the execution of the law. This reluctance to enter the hospital was owing partly to the heavy mortality which had occurred there during the time when it was full of children attacked in February, and partly to the preference of the people to be treated "hydropathically," even to the extent of resistance to magisterial authority.

The following table (and Plate IV.) gives the numbers removed throughout the epidemic, arranged in the weeks in which they were *attacked*, the deaths referring to those occurring amongst these cases:—

Date.	Removal to Hospital.		Remained at Home.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
June 1895 to January 4, 1896 -	28	2	5	2	33	4
Week ending January 11 - -	15	4	1	—	16	4
” ” ” 18 - -	9	3	—	—	9	3
” ” ” 25 - -	14	2	—	—	14	2
” ” February 1 - -	16	3	—	—	16	3
” ” ” 8 - -	10	2	3	—	13	2
” ” ” 15 -	15	5	2	—	17	5
” ” ” 22 - -	57	27	15	3	72	30
” ” ” 29 - -	40	15	13	—	53	15
” ” March 7 - -	60	16	31	5	91	21
” ” ” 14 - -	58	13	85	18	143	36
” ” ” 21 - -	46	15	105	21	151	35
” ” ” 28 - -	28	5	131	30	159	35
” ” April 4 - -	45	13	148	31	193	44
” ” ” 11 - - -	52	17	147	26	199	43
” ” ” 18 - -	66	19	106	15	172	34
” ” ” 25 - - -	40	9	117	19	157	28
” ” May 2 - -	24	4	75	10	99	14
” ” ” 9 - - -	19	3	74	20	93	23
” ” ” 16 - -	9	7	55	12	64	19
” ” ” 23 - - -	5	3	42	8	47	11
” ” ” 30 - -	10	4	42	7	52	11
” ” June 7 - - -	12	2	35	4	47	6
” ” ” 14 - -	10	—	11	4	21	4
” ” ” 21 - - -	7	—	8	—	15	—
” ” ” 28 - -	7	2	12	1	19	3
” ” July 4 - - -	4	1	3	—	7	1
” ” ” 11 - -	1	—	1	—	2	—
” ” ” 18 - - -	5	2	—	—	5	2
	712	198	1,267	236	1,979	434

Plate



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There were thus removed to hospital, 712 persons, of whom 198 died, a mortality of 27·8 per cent.

There remained under treatment in their homes 1,267, of whom 236 died, a mortality of 18·6 per cent.

It often happened in the course of the epidemic that only some of those attacked in a household could be isolated, and in many instances those were not the first cases to arise in the house. Without complicating the question by referring to all such instances, it may suffice to say that there were 425 households from which the *initial* cases of small-pox were sent to hospital. In 164 of these houses 352 additional cases occurred. Hence there were in the houses from which the earliest cases were removed :—

Single cases - - 261 or 61·4 per cent.
Multiple cases - - 164 „ 38·6 „

Contrasting these figures with those of the attacks in houses where the *initial* cases (and, in most instances, the later ones also) were not removed to hospital, but remained under treatment at home, there is no very appreciable degree of difference between the two series. Thus, in the latter category there were 673 households in which 1,203 cases occurred. In 268 of these there occurred more than one case of small-pox, the proportion therefore being :—

Houses with single cases - - - 405 or 60 per cent.
„ „ multiple cases - - 268 „ 40 „

The difference between the two series in the number of houses infected is barely 2 per cent.

A more exact comparison between these series is afforded by the following list which shows that, except where two cases occurred in a house, there was much uniformity in the two groups :—

	Number of Houses from which the Initial Case			
	Removed to Hospital.		Remained at Home.	
Yielding 1 case,	261 =	261 cases.	405 =	405 cases.
„ 2 cases,	80 =	160 „	146 =	292 „
„ 3 „	38 =	114 „	56 =	168 „
„ 4 „	17 =	68 „	27 =	108 „
„ 5 „	16 =	80 „	21 =	105 „
„ 6 „	6 =	36 „	10 =	60 „
„ 7 „	3 =	21 „	4 =	28 „
„ 8 „	2 =	16 „	2 =	16 „
„ 9 „	1 =	9 „	1 =	9 „
„ 11 „	1 =	11 „	—	—
„ 12 „	—	—	1 =	12 „
	425	776	673	1,203

This approximation of the extent of family infection, no matter whether the first case was removed or not, may be partly due to the fact that, in the first series, perhaps the later arising cases remained at home and infected others, and also that in the first period cases could not be removed so promptly. But even if this be the case it seems to show that hospital isolation, however promptly carried out, cannot prevent infection within the house, such infection often occurring, in my opinion, prior to the appearance of the exanthem, and therefore prior to any notification or removal.

Hospital isolation has its chief gain in limiting the spread of disease within a district, rather than within the infected household.

In preparing an analysis of the cases treated in hospital, I have been much assisted by a list of the cases compiled by Mr. Pitt who was the medical officer in charge when I arrived at Gloucester. There had been no register kept, but brief records were taken by him of the cases. It may be useful here to give an account of the condition of the inmates of the two hospitals on the occasion of my first visit on April 3rd. On that day there were in the wards of the Stroud Road Hospital 158 cases of small-pox, and in those of the Hempstead Hospital 55 cases. [In each building there was one case admitted from the Rural Sanitary District. These two cases will be excluded from my statistics which refer only to the Urban District.]

Stroud Road Hospital.—At this time the hospital consisted of six blocks, one of which was assigned to administrative purposes, whilst three had been recently opened.

Other blocks were in course of erection, one indeed being on the point of occupation. The five blocks, each of two wards, contained beds and patients as follow:—

Block II., Ward 1, contained 12 beds, some being large and double ones, the total number of patients (all children) being 23.

	Ward 2,	contained	11	beds,	occupied by	11	patients	(adult females).
Block III.,	„ 1,	„	15	„	„	15	„	(adult males).
	„ 2,	„	10	„	„	10	„	„
Block IV.,	„ 1,	„	14	„	„	19	„	(mostly children).
	„ 2,	„	11	„	„	11	„	(adult males).
Block V.,	„ 1,	„	13	„	„	16	„	(children only).
	„ 2,	„	12	„	„	18	„	(mostly children).
Block VI.,	„ 1,	„	17	„	„	17	„	(mostly male adults).
	„ 2,	„	15	„	„	20	„	(mostly children).

Thus there were 158 patients to 130 beds, but it is right to say that where two, three, or even four children occupied one bed, they were all convalescent cases, and the capacity of the beds was of a size admitting of their accommodation.

Of the 167 cases which had been admitted from the city since the beginning of the year into Stroud Road Hospital, 157 remained there on April 3rd, and 10 had been transferred to Hempstead; 9 had been admitted in January, 48 in February, 103 in March, and 7 in April. They comprised:—

Three patients under 1 year of age, 75 between the ages of 1 and 10 years, 51 between 10 and 30 years, 38 over 30 years.

Of the cases which were admitted in January, five were between 1 and 10 years, one was between 10 and 30, three were over 30.

Of the February cases, one was under 1 year, 38 between 1 and 10 years, five between 10 and 30 years, four over 30.

Of the March cases, two were under 1 year, 30 between 1 and 10, 41 between 10 and 30, and 30 were over 30 years.

Of the April cases, two were between 1 and 10 years, four between 10 and 30, and one was over 30 years.

Thus an excessive proportion of those in the hospital under 10 years of age had been admitted in the month of February.

Then as regards the type of the disease, one was of the *malignant* class, 77 of the *confluent*, 13 of the *coherent*, 39 of the *discrete*, and 37 of the *mild* or varioloid.

The malignant case was over 30 years of age.

Of the confluent cases, one was under 1 year of age, 45 between 1 and 10, 15 between 10 and 30, 16 over 30.

Of the coherent cases, nine were between 1 and 10 years, one between 10 and 30, three over 30.

Of the discrete cases, 17 were between 1 and 10 years, 15 between 10 and 30, seven over 30.

Of the mild cases, two were under 1 year, four between 1 and 10, 20 between 10 and 30, and 11 over 30.

Thus of all under 10 years, 59 per cent. were suffering from the severe type of small-pox (confluent), and of all above 10 years 36 per cent. (malignant and confluent), the proportion of severe cases being less between 10 and 30 than at ages over 30 years.

Of the whole number, 85 had been either vaccinated in infancy (or had been stated to have so been, although no certain evidence of it was present), and 82 were unvaccinated (or else had been vaccinated just prior to the attack of small-pox).

Of the "vaccinated," two were between 1 and 10 years, 45 between 10 and 30, 38 over 30 years.

Of the "unvaccinated," three were under 1 year, 73 between 1 and 10, and six between 10 and 30.

Thus whereas amongst those below 10 years of age upwards of 97 per cent. were "unvaccinated," amongst those above 10 barely 7 per cent. were in this condition.

The numbers and ages of those who those who were suffering from *secondary* (septic) *complications*, affording a further indication of the severity of the attacks, were as follow:

Abscesses, mostly cutaneous, occurred in 22 patients, 14 of whom were below the age of 10 years. One of these children suffered also from *otitis*, but there was no case of panophthalmitis among them. Of the eight patients above 10 years who had abscesses, six were above 30 years of age, and two of these had each lost one eye from destructive inflammation. One was a man aged 36 (No. 64 in list) whose left eye was thus destroyed; his attack had been a most severe one, and no traces of the infantile vaccination which he alleged had been performed could be detected on his arms. The other was a man of 32 who had similarly lost the right eye (No. 127 in list), and who had an abscess in the buttock as well as in lymphatic glands. Two other children also suffered from otitis. The six subjects over 30 years were the only ones amongst these patients who had been or were alleged to have been vaccinated in infancy.

Hempstead Hospital.—Only women and children were admitted here, including 10 children transferred from Stroud Road at the beginning of March, when this building was opened. One block, consisting of a single ward, was devoted to convalescents, it contained 15 patients. The other block of two wards contained acute cases, numbering 40 in all, 23 in one ward, and 17 in the other.

Of the 44 (city) cases admitted direct into this hospital who were there on April 3rd, 39 had been admitted in March, 5 in April. Of these 20 were between 1 and 10 years, 12 between 10 and 30, 12 over 30. There was a large proportion of severe cases, 30 being *confluent* attacks, two *coherent*, five *discrete*, and seven *mild*. They were thus distributed:—

Of the confluent attacks, 17 were in subjects between 1 and 10 years, five between 10 and 30, eight over 30.

Of the coherent cases, one was between 1 and 10, one between 10 and 30.

Of the discrete, four were between 10 and 30, one was over 30.

Of the mild cases, two were between 1 and 10, two between 10 and 30, one over 30.

Thus in the Hempstead Hospital (excluding the convalescent cases which had been transferred from Stroud Road) no less than 85 per cent. of those under 10 years of age were suffering from confluent small-pox, and 59 per cent. of those above 10 years.

Of these 44 patients, 21 were vaccinated, and 23 unvaccinated. Of the "vaccinated," 10 were between 10 and 30 years, 11 were over 30. Of the " unvaccinated," 20 were between 1 and 10, two between 10 and 30, and one was over 30.

Two of the patients were then suffering from abscesses, one (unvaccinated) aged 27, the other, 7 years; one, aged 4, had passed through an attack of pneumonia; another, aged 3, had laryngitis (a fatal case).

Disregarding the cases admitted in January and April, as affording figures too small for comparison, it is seen that altogether in February, there were admitted into the Stroud Road Hospital 111 patients, six of whom were subsequently transferred to Hempstead. There were 42 deaths amongst these cases, or 37·8 per cent. In March there were admitted in all 204 patients (Stroud Road 152, Hempstead Hospital 52), of whom 68 died (Stroud Road 42, Hempstead Hospital 16), or 33·5 per cent., or, in the two months together, 315 admissions, with 100 deaths, or 31·7 per cent.

Of the 315, rather more than half were under 10 years of age, viz., 160; whilst of the fatal cases more than three fourths, or 77, were of this age. In the month of February, when the mortality was highest, the proportion of children was also greatest, for of 111 cases, 76, or 68·4 per cent., were under 10, and of the 42 deaths 38, or 90 per cent., were of this age. In March, on the other hand, of the 204 cases, 84 were under 10, or 41·5 per cent., and of the 68 deaths, 39, or 57·3 per cent. were of this age.

This may be more particularly stated as *under* 1 *year*, eight admissions, six deaths, mortality 75 per cent.; *between* 1 *and* 10, 152 admissions, 71 deaths, or 46·7 per cent; *between* 10 *and* 30, 88 admissions, 13 deaths, or 14·7 per cent.; *over* 30, 67 admissions, 10 deaths, or 15 per cent.

The fatality at the age-period 1 to 10 years was in February exactly 50 per cent. (37 deaths among 74 admissions), in March (Stroud Road) 44·2 per cent. and (Hempstead) 42·3 per cent.

These figures are based on the following tables prepared from the data at my disposal.

STROUD ROAD HOSPITAL.—(February.)

Age.	Admissions.	Discharged.		Transferred to Hempstead.	In Hospital April 3rd.	
		Recovered.	Died.		Recovered.	Died.
Under 1 year - -	2	—	1	1	—	—
1 to 10 years - -	74	—	36	4	33	1
10 to 30 years - -	19	12	2	1	4	—
30 years and over - -	16	10	2	—	4	—
	111	22	41	6	41	1

STROUD ROAD HOSPITAL.—(March.)

Age.	Admissions.	Discharged.		In Hospital April 3rd.	
		Recovered.	Died.	Recovered.	Died.
Under 1 year - - -	5	—	3	1	1
1 to 10 years - - -	52	—	22	29	1
10 to 30 years - - -	57	7	9	40	1
30 years and over - -	38	3	5	30	—
	152	10	39	100	3

HEMPSTEAD HOSPITAL.—(March.)

Age.	Admissions.	Discharged.		In Hospital April 3rd.	
		Recovered.	Died.	Recovered.	Died.
Under 1 year - - -	1	—	1	—	—
1 to 10 years - - -	26	—	10	15	1
10 to 30 years - - -	12	—	1	11	—
30 years and upwards - -	13	—	1	10	2
	52	—	13	36	3

Comparison of Mortality from Small-pox between Cases sent to Hospital and those remaining at Home.

That the high death-rate amongst the cases admitted to the hospital during the months of February and March had considerable influence in deterring persons attacked with small-pox from entering the hospital has been a striking feature of this outbreak. By the middle of April the number of beds would have sufficed to have accommodated every case, yet the numbers admitted week by week continued to decline, whilst those remaining at home proved the large majority. It is therefore incumbent on me to attempt to discover whether there is any real ground for the general impression that the overcrowding of the Stroud Road buildings was the cause of the heightened mortality therein.

According to the data which I have collected, there were 712 cases treated in the hospitals, of which 198 proved fatal, a fatality of 27·8 per cent.; whilst there were 1,267 treated in their houses, 236 of which were fatal, a fatality of 18·7 per cent.

This divergence obtains at every period of life, but it will be observed that the proportion of those between the ages of 1 and 10 years admitted to hospital is higher than that of those remaining at home.

Age.	Sent to Hospital.		Remained at Home.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
	Per cent.	Per cent.	Per cent.	Per cent.		
Under 1 year - -	18	15	67	46	85	61
Proportion -	2·5	7·6	5·2	19·5		
Fatality -	—	83·3	—	68·6		
1 to 10 years - -	267	112	354	107	621	219
Proportion -	37·5	56·5	27·9	45·3		
Fatality -	—	42·	—	30·2		
10 years and upwards	427	71	846	83	1,273	154
Proportion -	60·	35·9	66·7	35·2		
Fatality -	—	16·6	—	9·8		
Total -	712	198	1,267	236	1,979	434

In order that the particular gravamen may be investigated, it will be useful to contrast these figures at two different periods of the epidemic. For this purpose we may make a division at the end of the last week in March (28th), by which date 787 cases had occurred, of which 191 were fatal, a mortality of 24·2 per cent. From March 29th to July 18th there were 1,192 cases, of which 243 were fatal, a mortality of 20·3 per cent.

Age.	Period A.		Period B.		Total.	
	June 1895 to March 28, 1896.		March 29 to July 18, 1896.			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Under 1 year - -	27	20	58	41	85	61
1 to 10 years -	307	120	314	99	621	219
10 years and upwards	453	51	820	103	1,273	154
	787	191	1,192	243	1,979	434

The preponderance of children attacked in the first of these two periods is marked, the proportion of those aged 1 to 10 years to the whole number attacked being 39 per cent. in the first, and 26·6 per cent. in the second.

PERIOD A.—(June 1895 to March 28th, 1896.)

Age.	Sent to Hospital.		Remained at Home.	
	Cases.	Deaths.	Cases.	Deaths.
	Per cent.	Per cent.	Per cent.	Per cent.
Under 1 year - -	12	9	15	11
Proportion - -	3·	8·	3·8	13·9
Fatality - -	—	75·	—	73·3
1 to 10 years - - -	183	76	124	44
Proportion - -	46·2	67·8	31·7	55·7
Fatality - - -	—	41·5	—	35·5
10 years and over - -	201	27	252	24
Proportion - -	50·7	24·1	64·4	30·4
Fatality - -	—	13·4	—	9·9
	396	112	391	79

PERIOD B.—(March 29th to July 18th, 1896.)

Age.	Sent to Hospital.				Remained at Home.			
	Cases.		Deaths.		Cases.		Deaths.	
		Per cent.		Per cent.		Per cent.		Per cent.
Under 1 year	6		6		52		35	
Proportion		1·9		7·		6·		22·3
Fatality		—		100		—		67·3
1 to 10 years	84		36		230		63	
Proportion		26·6		41·8		26·2		40·1
Fatality		—		42·8		—		27·8
10 years and over	226		44		594		59	
Proportion		71·5		51·1		67·8		37·6
Fatality		—		19·4		—		10·
	316		86		876		157	

Thus, in the first period, there were removed to hospital 396, of whom 112 died, a fatality of 28·3 per cent.; there remained at home 391, of whom 79 died, a fatality of 20·2 per cent.

In the second period, there were removed to hospital, 316, of whom 86 died, a fatality of 27·2 per cent.; there remained at home 876, of whom 157 died, a fatality of 17·9 per cent.

In respect to *age*, it will be seen that the preponderance of children noted in the first period is found mainly in the hospital group, and is ascribable to the large numbers admitted in the month of February of children attending the Widden Street and St. Luke's schools. In each period also, and at every age, the mortality was higher among those in hospital than among those remaining at home.

Nor, when we similarly contrast these two groups, in respect to their vaccination condition, do we find any material differences from the foregoing relations.

Of the 712 cases treated in hospital, 389 were "vaccinated," with 50 deaths, or 54·6 per cent. of the whole number, with a fatality of 12·8 per cent.

Of the 1,267 cases remaining at home, 822 were "vaccinated," with 70 deaths, or 64·8 per cent. of the whole number, with a fatality of 8·5 per cent.

Of the hospital cases, 323 were "unvaccinated," with 148 deaths, a proportion of 45·3 per cent. of the whole number, with a fatality of 45·8 per cent.

Of the cases remaining at home, 445 were "unvaccinated," with 166 deaths, a proportion of 35·1 per cent., fatality 37·3 per cent.

Again, the comparison may be made for each of the two periods above taken in dealing with age incidence with similar general result; except that the "unvaccinated" class predominated during the earlier period amongst those sent away from home :—

PERIOD A.—(June 1895 to March 28th, 1896.)

Class.	Sent to Hospital.				Remained at Home.				Total.			
	Cases.		Deaths.		Cases.		Deaths.		Cases.		Deaths.	
		Per cent.		Per cent.		Per cent.		Per cent.		Per cent.		Per cent.
Vaccinated	182		18		246		21		428		39	
Proportion		46·		16·		63·		26·6		54·3		20·4
Fatality		—		10·		—		8·3		—		9·4
Unvaccinated	214		94		145		58		359		152	
Proportion		54·		84·		37·		73·4		45·6		79·5
Fatality		—		44·		—		40·		—		42·3
	396		112		391		79		787		191	

Period B.—(March 29th to July 18th, 1896.)

Class.	Sent to Hospital.		Remained at Home.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Vaccinated - -	207	32	576	49	783	81
Proportion -	65·5	37·2	65·7	31·2	65·7	33·3
Fatality -	—	15·3	—	8·5	—	10·3
Unvaccinated - -	109	54	300	108	409	162
Proportion -	34·5	62·8	34·2	68·8	34·3	66·6
Fatality -	—	49·5	—	36·0	—	39·6
	316	86	876	157	1,192	243

This analysis shows further that, whereas in the first months the fatality in the vaccinated and unvaccinated classes respectively was only slightly higher in the hospital than in the houses, there was in the later months an excess for the vaccinated in hospital of 7 per cent., and of the unvaccinated of 13 per cent. over the rates of those treated at home.

So far it would appear as if the impression that the hospital itself were a cause of heightened mortality was grounded on fact. But it would not be fair to draw such an inference. These figures require to be controlled by statistics, showing the relative *severity* of the attacks in each series. This, I am able to supply, as with the exception of a few of the 1895 cases, and of those which proved fatal prior to my visit, I have notes of the type of attack from which every patient suffered. It will not, I think, be contended by anyone conversant with small-pox, that a case of mild or discrete type can ever become converted into one of confluent or malignant, whatever the environment or the mode of treatment. These types are as definite and pronounced as if they were specifically distinct diseases. The distinction between "coherence" and "confluence" is, perhaps, not so easily defined, but, so far as my own record goes, I have strictly limited the use of the term "coherent" to cases but little removed from the discrete form.

Analysing once more these two series (hospital and home) on the plan previously pursued, and arranging the cases into three groups: *a.* Malignant and confluent; *b.* Coherent and discrete, and *c.* Mild, we obtain the following results:—

Excluding the three "indeterminate" types of small-pox in new-born infants, there were 1,976 cases, 431 deaths. These cases comprise 852 of the malignant and confluent types, or 43·1 per cent. of all attacked; 619 of the coherent and discrete types, or 31·3 per cent.; 505 of mild type, or 25·5 per cent.

Of 710 cases sent to hospital, 382, or 53·8 per cent. were of malignant and confluent types; 186, or 26·2 per cent. of coherent and discrete; 142, or 20·0 per cent. of mild type.

Of 1,266 cases remaining at home, 470, or 37·1 per cent. were of malignant and confluent types; 433, or 34·2 per cent. of coherent and discrete; 363, or 28·6 per cent. of mild type.

This shows that the severe cases preponderated in the "hospital" over the "home" series by nearly 17 per cent.

Moreover, the actual mortality was not much different in the two series; for in the "hospital" series there were 195 deaths among 382 malignant and confluent cases, *i.e.*, 51·0 per cent. fatality; and in the "home" series there were 232 deaths among 470 malignant and confluent cases, or 49·3 per cent.*

If any notable difference had occurred in the conditions favourable or unfavourable to recovery, it would have been expressed in such a return as this. I am myself convinced that no such differences did exist, and bearing in mind the great pressure on the hospital staff during the few weeks that the wards were overcrowded, the fact that there is no indication of any marked excess in fatality, is a strong testimony to the manner in which their arduous duties were performed. That there were palpable defects in the hospital equipment is admitted on all sides, but that any great increase in mortality accrued thereby is, I hope, amply disproved by the facts here presented.

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* It is noteworthy that the hospital mortality during the first half of the epidemic, the time that it was most full of patients, was, relative to the high proportion of severe cases, actually lower than the home mortality, and much below the hospital rate during the remaining weeks, yet the general mortality had declined with the decline of the outbreak.

Finally, it may be of interest to contrast the incidence of the disease in respect to type, during the two periods which have been selected for comparison in other directions.

PERIOD A.—(June 1895 to March 28th, 1896.)

Type.	Sent to Hospital.		Remained at Home.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent
Malignant and confluent.	228	111	157	78	385	189
Proportion	57·5	48·7	40·2	49·7	49·0	49·1
Coherent and discrete	87	1	126	—	213	1
Proportion	22·0	—	32·3	—	27·0	—
Mild	81	—	107	—	188	—
Proportion	20·5	—	27·4	—	24.0	—
	396	112	390	78	786	190
	—	28·2	—	20·0	—	—

PERIOD B.—(March 29th to July 18th, 1896.)

Type.	Sent to Hospital.		Remained at Home.		Total.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Malignant and confluent.	154	84	313	154	467	238
Proportion	49.0	54·5	35·7	49·2	—	51·0
Coherent and discrete	99	—	307	3	406	3
Proportion	31.5	—	35·0	—	—	—
Mild	61	—	256	—	317	—
Proportion	19·4	—	29·2	—	—	—
	314	84	876	157	1,190	241
	—	26·7	—	17·9	—	—

It will be seen that during each period the same relative excess of severe cases occurred among those removed to hospital; and this is, I believe, in accord with general experience of all epidemic diseases where the means of isolation are limited. The worst cases are sent away by preference. Hence hospital fatality, in other fevers as well as in small-pox, always contrasts unfavourably with home fatality.

PART III.

SMALL-POX AND VACCINATION.

§ 12. Age, Sex, and Fatality of those attacked with Small-pox.

§ 13. Type of the Disease.
Relative Proportion of Various Types during each week of the Outbreak.
Period of Greatest Severity.
Type of Attacks, in respect to Age-incidence.
Analysis of each Type, in respect to Age and Vaccination condition.
1. Malignant. 2. Confluent. 3. Coherent. 4. Discrete. 5. Mild.

§ 14. Vaccination Statistics.
Distribution of Vaccinated and Unvaccinated Classes at Various Periods of the Outbreak.
Comparison in respect to Age-incidence.
The Vaccinated Class. Type of attacks in, A. — Vaccinated. Re-vaccinated. B. — Alleged vaccination. C.—No information as to vaccination.
The Unvaccinated Class. Types of attacks. A.—Under vaccination. Detailed list. B.—Unvaccinated.

§ 12. AGE, SEX, AND FATALITY.

There were 1,979 cases of small-pox, 434 deaths, a case mortality of 21·3 per cent. Of those attacked, 977 were males, 225 deaths, a fatality of 23 per cent.; 1,002 were females, 209 deaths, a fatality of 20·8 per cent.

The age-incidence was :—

Age.	Cases.	Deaths.	Fatality.
Under 1 year - - - - - -	85	61	71· per cent.
1 to 10 years - - - - -	621	219	35·2 „
10 to 30 „ - - - - - - -	701	56	8· „
30 and upwards - - - -	572	98	17·1 „

Of those in the period, " under one year," there were 22 aged one month and under, and only one of these survived the attack.

TABLE I.

SEX and AGE-INCIDENCE of SMALL-POX.

Age.	Males.		Females.		Both Sexes.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Under 1 month -	11	11	11	10	22	21
1 month to 1 year -	32	21	31	19	63	40
1 year to 5 years -	131	57	140	57	271	114
5 to 10 years - -	180	59	170	46	350	105
10 to 15 years -	72	5	79	5	151	10
15 to 20 „ - -	82	3	78	6	160	9
20 to 30 „	200	19	190	18	390	37
30 to 40 „ - -	143	16	156	28	299	44
40 to 50 „ -	77	15	76	10	153	25
50 to 60 „ - -	28	9	41	7	69	16
60 to 70 „ -	14	7	23	2	37	9
70 and over - -	7	3	7	1	14	4
	977	225	1,002	209	1,979	434

The epidemic reached its acme in the week ending April 11th, but the greatest fatality occurred in the month of February, in which month also the number of children attacked was proportionally greater than at any other period of the epidemic.

As illustrating this, the 28 weeks of 1896 may be divided into seven four-weekly periods, and contrasted as to the numbers attacked and their mortality :—

Period.	Attacks.	Deaths.	Mortality.
From June 15, 1895, to January 4, 1896 - - -	33	4	12·2 per cent.
„ January 5, 1896 to February 1, 1896 - -	55	12	21·8 „ „
„ February 2, 1896, to February 29, 1896 - -	155	52	33·5 „ „
„ March 1, 1896, to March 28, 1896 - - -	544	123	22·6 „ „
„ March 29, 1896, to April 25, 1896 - - -	721	149	20·6 „ „
„ April 26, 1896, to May 23, 1896 - - -	303	67	22·1 „ „
„ May 24, 1896, to June 20, 1896 - - -	135	21	15·2 „ „
„ June 21, 1896, to July 18, 1896 - - -	33	6	18·2 „ „

§ 13. Character of the Epidemic.

There was an unusually large proportion of malignant and confluent cases, of the former especially.

The following table gives the weekly occurrence of cases of each of the five types, the inclusion of three cases of "indeterminate" type being necessitated by the fact that they were new-born infants who survived only a few hours, without exhibiting any characteristic rash.

Table II.

Weekly Incidence of Cases of Small-Pox, according to Type of Attack.

Period.	Malignant.		Confluent.		Coherent.		Discrete.		Mild.		Indeterminate.		Total Cases.	Total Deaths.
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases	Deaths.	Cases.	Deaths.	Cases.	Deaths.		
June, 1895, to January 4, 1896.	1	1	10	3	—	—	6	—	16	—	—	—	33	4
Week ending January 11	—	—	12	4	—	—	—	—	4	—	—	—	16	4
„ „ 18	—	—	7	3	—	—	2	—	—	—	—	—	9	3
„ „ 25	1	1	5	1	—	—	3	—	5	—	—	—	14	2
„ Feb. 1 -	1	1	6	2	1	—	3	—	5	—	—	—	16	3
„ „ 8 -	1	1	7	1	1	—	1	—	3	—	—	—	13	2
„ „ 15 -	—	—	10	5	2	—	3	—	2	—	—	—	17	5
„ „ 22 -	1	1	49	29	3	—	9	—	10	—	—	—	72	30
„ „ 29 -	—	—	30	15	6	—	9	—	8	—	—	—	53	15
„ March 7 -	—	—	45	21	—	—	15	—	31	—	—	—	91	21
„ „ 14 -	3	3	64	27	8	—	36	—	31	—	1	1	143	31
„ „ 21 -	6	6	64	30	13	—	30	—	38	—	—	—	151	36
„ „ 28 -	7	7	55	27	20	1	41	—	36	—	—	—	159	35
„ April 4 -	12	12	74	32	20	—	40	—	47	—	—	—	193	44
„ „ 11 -	14	14	73	27	20	—	38	1	53	—	1	1	199	43
„ „ 18 -	5	5	68	28	16	—	34	—	48	—	1	1	172	34
„ „ 25 -	5	5	46	22	19	—	33	1	54	—	—	—	157	28
„ May 2 -	4	4	30	10	16	—	25	—	24	—	—	—	99	14
„ „ 9 -	5	5	34	18	14	—	17	—	23	—	—	—	93	23
„ „ 16 -	—	—	29	19	10	—	11	—	14	—	—	—	64	19
„ „ 23 -	2	2	15	8	4	1	10	—	16	—	—	—	47	11
„ „ 30 -	1	1	19	10	9	—	13	—	10	—	—	—	52	11
„ June 6 -	—	—	14	6	9	—	11	—	13	—	—	—	47	6
„ „ 13 -	3	3	2	1	4	—	7	—	5	—	—	—	21	4
„ „ 20 -	—	—	1	—	4	—	9	—	1	—	—	—	15	—
„ „ 27 -	—	—	7	3	2	—	8	—	2	—	—	—	19	3
„ July 4 -	—	—	2	1	1	—	—	—	4	—	—	—	7	1
„ „ 11 -	—	—	—	—	—	—	—	—	2	—	—	—	2	—
„ „ 18 -	1	1	1	1	1	—	1	—	1	—	—	—	5	2
	73	73	779	354	204	2	415	2	505	—	3	3	1,979	434

There were thus—

Cases of Malignant Type - - - - -	73	with	73	deaths.
„ Confluent „ - - -	779	„	354	„
„ Coherent „ - - - - -	204	„	2	„
„ Discrete „ - - -	415	„	2	„
„ Mild „ - - - - -	505	„	0	„
„ Indeterminate Type - -	3	„	3	„
	1,979		434	

Combining the malignant and confluent cases, these together formed 43 per cent. of the whole number attacked; the coherent and discrete together, 31·4 per cent.; the mild, 25·5 per cent.

Judging from the relative proportion of severe cases the epidemic attained its greatest intensity in the month of February (as already shown by the comparative mortality rates), and thence it gradually declined, as the following figures show:—

Period.	Malignant and Confluent.	Coherent and Discrete.	Mild.
June 1895 to January 4, 1896	11 or 33·3 per cent.	6 or 18·2 per cent.	16 or 48·5 per cent.
January 5 to February 1, 1896	32 „ 58·2 „	9 „ 16·4 „	14 „ 25·4 „
Feb. 2 to Feb. 29, 1896 -	98 „ 63·2 „	34 „ 22· „	23 „ 14·8 „
March 1 to March 28, 1896 -	243 „ 44·6 „	165 „ 30·4 „	135 „ 24·8 „
March 29 to April 25, 1896 -	298 „ 41·3 „	220 „ 30·6 „	201 „ 27·8 „
April 26 to May 23, 1896 -	119 „ 39·2 „	106 „ 35·1 „	78 „ 25·7 „
May 24 to June 20, 1896 -	40 „ 29·6 „	66 „ 49· „	29 „ 21·4 „
June 21 to July 18, 1896 -	11 „ 33·3 „	13 „ 39·4 „	9 „ 27·3 „
	852 „ 43·0 „	619 „ 31·4 „	505 „ 25·5 „

TABLE III.

SMALL POX.—Type of Attack and Age.

Age.	Malignant.		Confluent.		Coherent.		Discrete.		Mild.		Indeterminate.		Total Cases.	Total Deaths.
	Cases.	Deaths.	Cases	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.		
1 month and under -	5	5	14	13	—	—	—	—	—	—	3	3	22	21
1 month to 1 year -	4	4	41	35	4	1	8	—	6	—	—	—	63	40
1 to 5 years -	6	6	192	108	34	—	26	—	13	—	—	—	271	114
5 to 10 „ - -	13	13	229	92	43	—	36	—	29	—	—	—	350	105
10 to 15 „ -	2	2	37	8	5	—	33	—	74	—	—	—	151	10
15 to 20 „ - -	4	4	26	5	9	—	51	—	70	—	—	—	160	9
20 to 30 „ -	12	12	88	25	40	—	112	—	138	—	—	—	390	37
30 to 40 „ - -	13	13	83	31	39	—	72	—	92	—	—	—	299	44
40 to 50 „ -	11	11	36	13	17	—	43	1	46	—	—	—	153	25
50 to 60 „ - -	2	2	19	13	9	1	23	—	16	—	—	—	69	16
60 to 70 „ -	1	1	9	8	3	—	8	—	16	—	—	—	37	9
70 and over - -	—	—	5	3	1	—	3	1	5	—	—	—	14	4
	73	73	779	354	204	2	415	2	505	—	3	3	1,979	434

MALIGNANT TYPE.

There were no fewer than 73 fatal cases of true malignant small-pox, *i.e.*, a diffuse morbiliform rash, associated with petechial hæmorrhages in the skin, and not infrequently with hæmorrhages from mucous membranes. Death occurred rapidly, sometimes within two days of onset. Their ages and vaccination conditions are given in the accompanying table:—

TABLE IV.

MALIGNANT SMALL-POX.—Age and Vaccination.

Age.	Vaccinated.		Alleged Vaccination.		No information on Vaccination.		"Under" Vaccination.		Unvaccinated.		Total Cases.	Total Deaths.
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths	Cases.	Deaths.		
1 month and under	—	—	—	—	—	—	—	—	5	5	5	5
1 month to 1 year -	—	—	—	—	—	—	—	—	4	4	4	4
1 to 5 years - -	—	—	—	—	—	—	1	1	5	5	6	6
5 to 10 years -	—	—	—	—	—	—	1	1	12	12	13	13
10 to 15 years -	—	—	—	—	—	—	—	—	2	2	2	2
15 to 20 „ -	3	3	1	1	—	—	—	—	—	—	4	4
20 to 30 „ -	7	7	2	2	—	—	—	—	3	3	12	12
30 to 40 „ -	6	6	3	3	1	1	—	—	3	3	13	13
40 to 50 „ -	11	11	—	—	—	—	—	—	—	—	11	11
50 to 60 „ -	1	1	1	1	—	—	—	—	—	—	2	2
60 to 70 „ -	1	1	—	—	—	—	—	—	—	—	1	1
	19	19	7	7	1	1	2	2	34	34	73	73

It will be observed that a considerable number of the cases of this class occurred amongst adults who had been vaccinated in infancy. Some of these were not robust when attacked, but several had enjoyed good health previously, and one can only attribute the type to the patient having received a specially intense dose of the virus.

CONFLUENT TYPE.

There were 779 cases in which the eruption became confluent. Several of these were very severe, with hæmorrhages occurring into the pustules on the skin, but not all of these latter were fatal. The deaths in this class amounted to 354, or 45·4 per cent.

TABLE V.

CONFLUENT SMALL-POX.—Age and Vaccination.

Age.	Vaccinated.		Alleged Vaccination.		No Information on Vaccination.		" Under " Vaccination.		Unvaccinated.		Total Cases.	Total Deaths.
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.		
1 month and under.	—	—	—	—	—	—	—	—	14	13	14	13
1 month to 1 year	—	—	—	—	—	—	3	3	38	32	41	35
1 to 5 years -	1	1	—	—	—	—	26	18	165	89	192	108
5 to 10 ,, -	2	—	—	—	—	—	8	3	219	89	229	92
10 to 15 ,, -	11	1	1	—	—	—	1	—	24	7	37	8
15 to 20 ,, -	16	—	1	—	—	—	—	—	9	5	26	5
20 to 30 ,, -	67	16	7	3	2	1	3	1	9	4	88	25
30 to 40 ,, -	69	23	7	3	—	—	1	—	6	5	83	31
40 to 50 ,, -	28	9	3	1	—	—	—	—	5	3	36	13
50 to 60 ,, -	16	10	2	2	—	—	—	—	1	1	19	13
60 to 70 ,, -	8	7	—	—	—	—	—	—	1	1	9	8
70 and over -	5	3	—	—	—	—	—	—	—	—	5	3
	223	70	21	9	2	1	42	25	491	249	779	354

This is the usual type of small-pox met with in unvaccinated children. The rash is confluent on the face especially, whilst the limbs may be covered with large full pustules more or less closely aggregated. It is very seldom that such large pustules (like mistletoe berries) occur in the vaccinated child, although in adults many severe cases do occur. There are also certain mortifications in course and character to be observed in this type of the disease, almost exclusively amongst the vaccinated. One is that, after a severe onset and very full eruption, the stage of maturation is remarkably abbreviated, there being comparatively little suppuration, and consequently no secondary fever. Another is an eruption of closely aggregated, broad, flat, papules, which give the face an aspect not unlike that of elephantiasis; such cases are not common. They do not become pustular.

The profuseness of the rash, concealing the sites of vaccination, accounts for the rather large proportion of the "alleged vaccination" class in the above table, a proportion which would doubtless have been heightened had opportunity occurred for thorough inspection of every case other than those in hospital.

COHERENT TYPE.

There were 204 cases in which the eruption was considered to be coherent. These approximated more to the discrete variety than the confluent, many having only a few coherent pustules on the face. There were two fatal cases, one an infant, and the other a woman, aged 56.

There were no cases under the age of one month.

TABLE VI.

COHERENT SMALL-POX.—Age and Vaccination.

Age.	Vaccinated.		Alleged Vaccination.		"Under" Vaccination.		Unvaccinated.		Total Cases.	Total Deaths.
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.		
1 month to 1 year - -	—	—	—	—	1	—	3	1	4	1
1 to 5 years - -	—	—	—	—	3	—	31	—	34	—
5 to 10 ,, - -	1	—	1	—	12	—	29	—	43	—
10 to 15 ,, - - - -	3	—	—	—	1	—	1	—	5	—
15 to 20 ,, - -	7	—	—	—	—	—	2	—	9	—
20 to 30 ,, - - - -	38	—	1	—	—	—	1	—	40	—
30 to 40 ,, - -	36	—	1	—	—	—	2	—	39	—
40 to 50 ,, - - - -	16	—	—	—	—	—	1	—	17	—
50 to 60 ,, - -	9	1	—	—	—	—	—	—	9	1
60 to 70 ,, - - - -	3	—	—	—	—	—	—	—	3	—
70 and over - -	—	—	1	—	—	—	—	—	1	—
	113	1	4	—	17	—	70	1	204	2

DISCRETE TYPE.

There were 415 cases of the discrete type of eruption varying much in the extent of the rash. The two deaths were not due to variola *per se*, but to intercurrent diseases (phthisis in one, bronchitis in the other).

TABLE VII.

DISCRETE SMALL-POX.—Age and Vaccination.

Age.	Vaccinated.		Alleged Vaccination.		"Under" Vaccination.		Unvaccinated.		Total Cases.	Total Deaths.
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.		
1 month to 1 year - -	—	—	—	—	2	—	6	—	8	—
1 to 5 years - - -	—	—	—	—	7	—	19	—	26	—
5 to 10 ,, - -	4	—	—	—	5	—	27	—	36	—
10 to 15 ,, - - -	31	—	—	—	—	—	2	—	33	—
15 to 20 ,, - -	49	—	—	—	1	—	1	—	51	—
20 to 30 ,, - - -	110	—	1	—	—	—	1	—	112	—
30 to 40 ,, - -	69	—	2	—	—	—	1	—	72	—
40 to 50 ,, - - -	41	1	1	—	—	—	1	—	43	1
50 to 60 ,, - -	21	—	1	—	—	—	1	—	23	—
60 to 70 ,, - - -	8	—	—	—	—	—	—	—	8	—
70 and over - -	3	1	—	—	—	—	—	—	3	1
	336	2	5	—	15	—	59	—	415	2

MILD TYPE.

There are 505 cases in this category, the majority having a most sparse eruption, and very slight prodromal fever. The group includes five cases of *inoculated* small-pox, all in vaccinated subjects, who were inoculated whilst nursing severe cases in their families.

Table VIII.

Mild Small-Pox.—Age and Vaccination.

Age.	Vaccinated.		Alleged Vaccination.		"Under" Vaccination.		Unvaccinated.		Total Cases.	Total Deaths.
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.		
One month to one year -	—	—	—	—	4	—	2	—	6	—
1 to 5 years - -	—	—	—	—	4	—	9	—	13	—
5 to 10 „ - -	17	—	—	—	3	—	9	—	29	—
10 to 15 „ - -	71	—	—	—	2	—	1	—	74	—
15 to 20 „ - -	69	—	—	—	—	—	1	—	70	—
20 to 30 „ - -	137	—	1	—	—	—	—	—	138	—
30 to 40 „ - -	92	—	—	—	—	—	—	—	92	—
40 to 50 „ - -	46	—	—	—	—	—	—	—	46	—
50 to 60 „ - -	16	—	—	—	—	—	—	—	16	—
60 to 70 „ - -	14	—	2	—	—	—	—	—	16	—
70 and over - -	5	—	—	—	—	—	—	—	5	—
	467	—	3	—	13	—	22	—	505	—

§14. Small-Pox and Vaccination.

In the following table the incidence of small-pox amongst the vaccinated and unvaccinated during each week of 1896 is given (*see also* Plates V. and VI.); and it will be seen that the period of greatest severity, *i.e.*—the month of February—which has already been exemplified from our analysis of the mortality and of the type of attacks is that period in which the unvaccinated class preponderated.

In the "vaccinated class" are included those who were "alleged" to have been unvaccinated, but who showed no evidence of it, and those in which no information could be obtained; whilst in the "unvaccinated class" are included those who were "under" vaccination when attacked, *i.e.*, vaccinated primarily during the incubation stage.

Period.	Vaccinated Class.		Unvaccinated Class.		Total.
	Attacks.	Proportion.	Attacks.	Proportion.	
June, 1895 to Jan. 4, 1896 -	23	69·7 per cent.	10	31·3 per cent.	33
January 5, to February 1, 1896 -	29	52·7 „	26	47·3 „	55
February 2 to February 29, 1896	46	29·7 „	109	70·3 „	155
March 1 to March 28, 1896 -	330	60·6 „	214	39·4 „	544
March 29 to April 25, 1896 -	474	65·7 „	247	34·3 „	721
April 26 to May 23, 1896 -	189	62·3 „	114	37·7 „	303
May 24 to June 20, 1896 -	94	69·6 „	41	31·4 „	135
June 21 to July 18, 1896 -	26	78·8 „	7	21·2 „	33
	1,211	61·2 „	768	38·8 „	1,979

Table IX.

Weekly Incidence of Small-Pox according to Vaccination Condition of the attacked.

Date.	Vaccinated.		Alleged Vaccination.		No information.		"Under" Vaccination.		Unvaccinated.		Total Cases.	Total Deaths.
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.		
June, 1895, to January 4, 1896.	22	—	—	—	1	—	—	—	10	4	33	4
Week ending— January 11.	5	2	—	—	—	—	—	—	11	2	16	4
January 18 -	3	1	—	—	—	—	—	—	6	2	9	3
„ 25 -	7	—	1	—	—	—	1	—	5	2	14	2

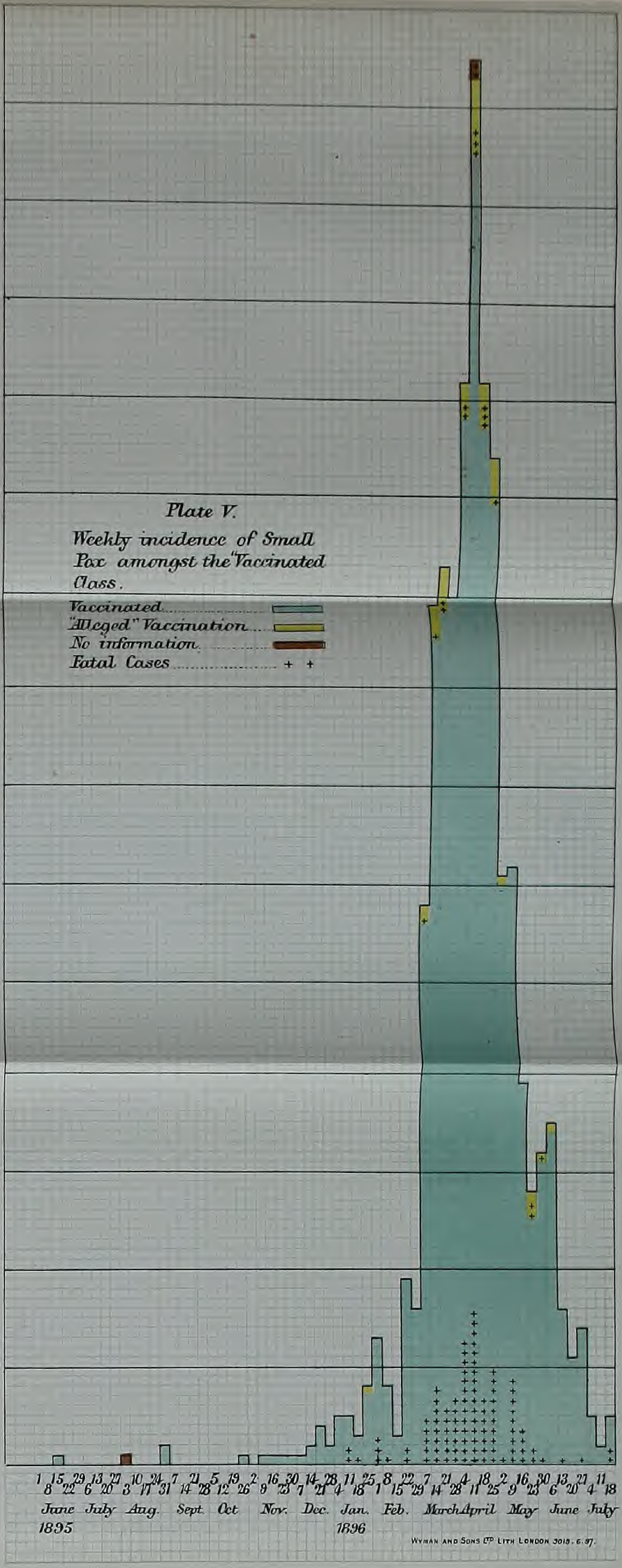


Plate V.

Weekly incidence of Small Pox amongst the "Vaccinated" Class.

Wyman and Sons Ltd Lith London 3018. 6. 97.

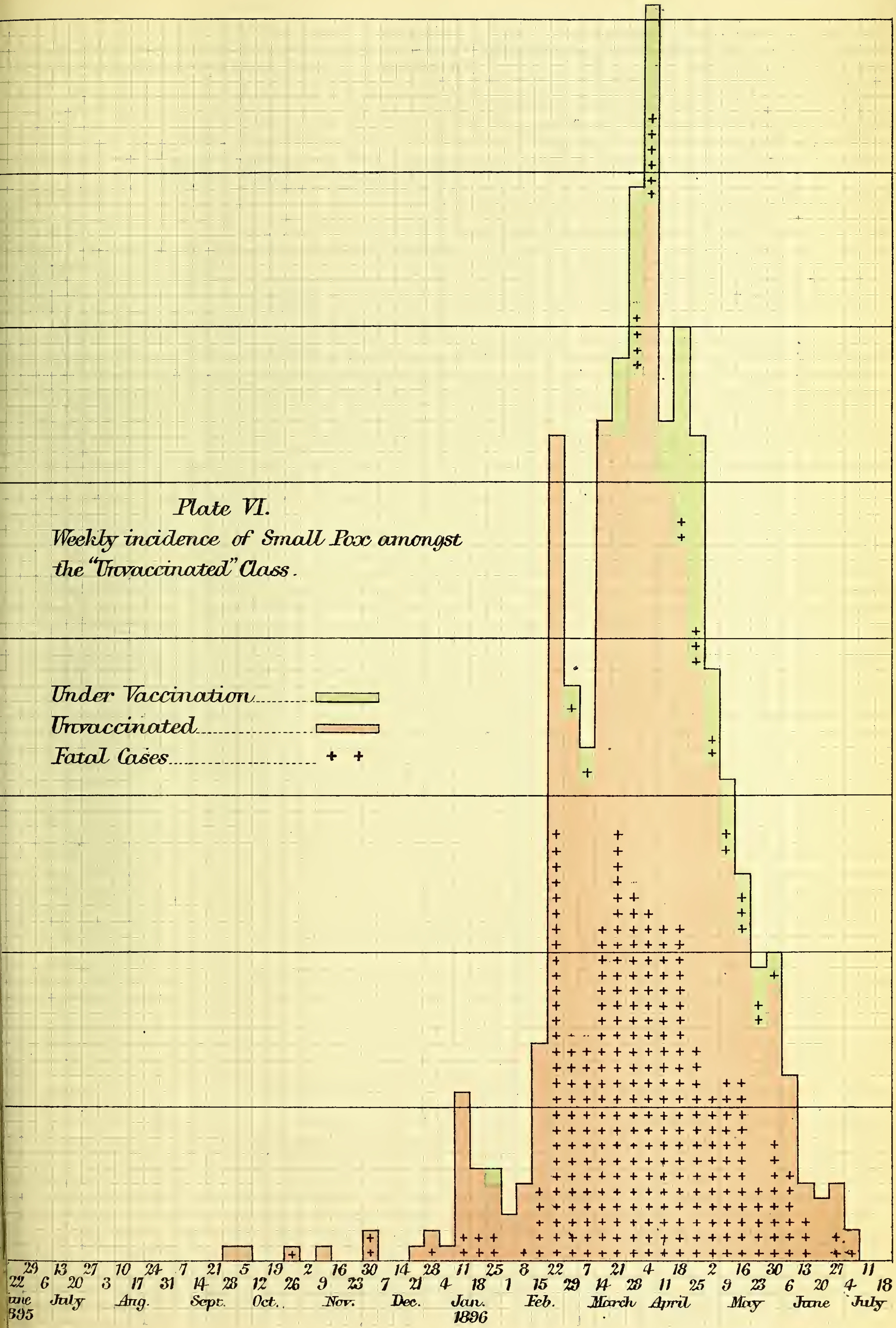
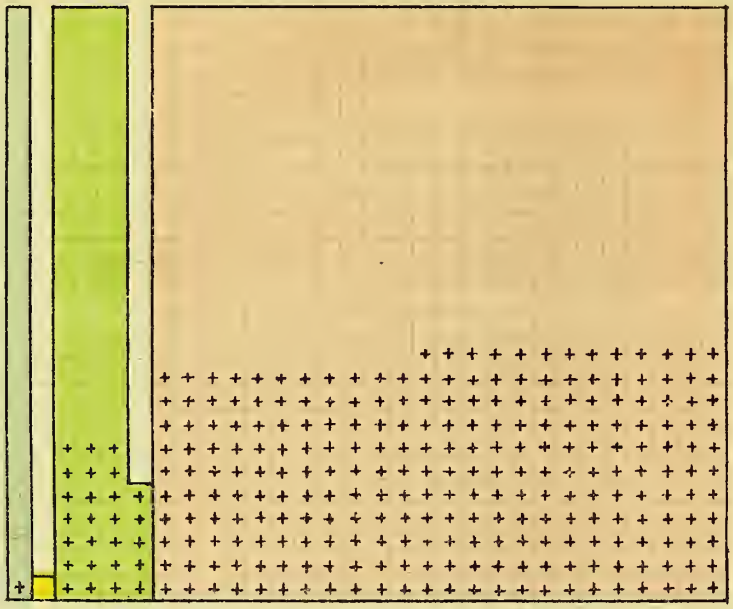


Plate VI.

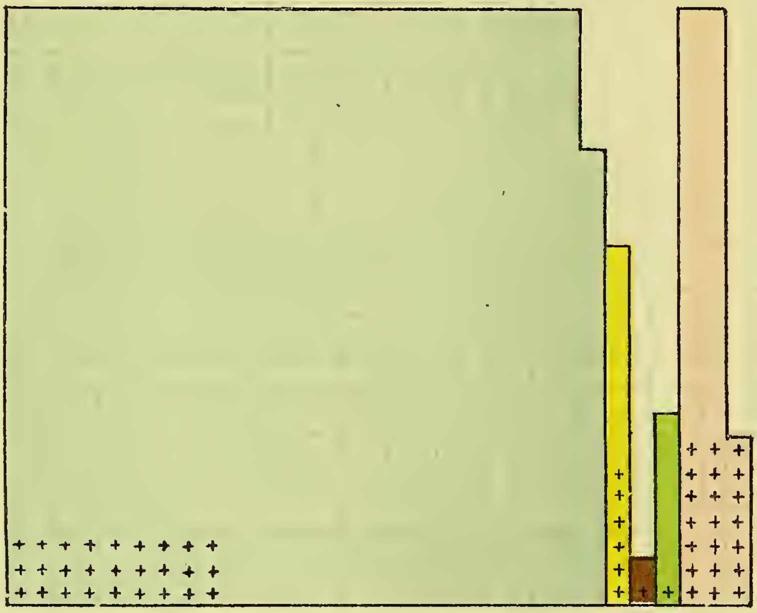
Weekly incidence of Small Pox amongst the "Unvaccinated" Class.

Wyman and Sons Ltd Lith London 9019.E.97.

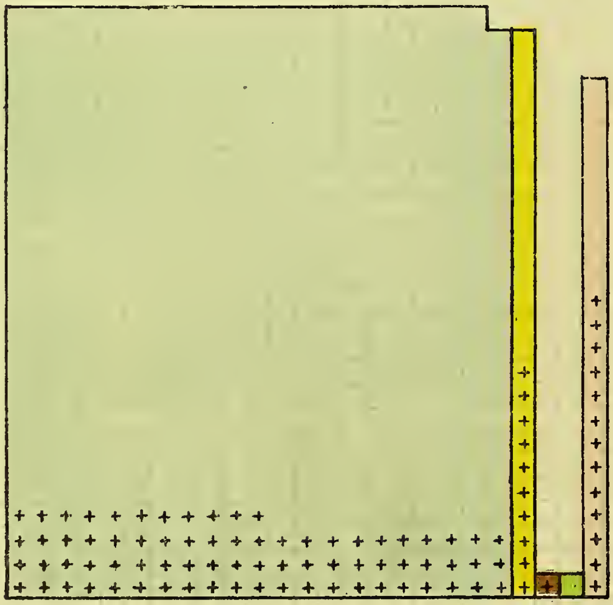
SMALL POX ATTACKS, AND DEATHS WITH REGARD TO AGE AND VACCINATION.



UNDER 10 YEARS.



10 TO 30 YEARS.



30 YEARS & OVER.

Vaccinated.	▭	*Under Vaccination.*	🟩
Alleged Vaccination.	🟨	*Unvaccinated.*	▭
No information.	🟫	*Fatal Cases.*	+ +

To face p. 143.

Wyman & Sons, Ld. Lith. 9019.3.97.

Date.	Vaccinated.		Alleged Vaccination.		No Information.		" Under " Vaccination.		Unvaccinated.		Total Cases.	Total Deaths.
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.		
Week ending—												
February 1 -	13	3	—	—	—	—	—	—	3	—	16	3
„ 8 -	8	1	—	—	—	—	—	—	5	1	12	2
„ 15 -	3	—	—	—	—	—	—	—	14	5	17	5
„ 22 -	19	2	—	—	—	—	—	—	53	28	72	30
„ 29 -	16	—	—	—	—	—	2	1	35	14	53	15
March 7 - -	56	5	2	1	—	—	2	1	31	14	91	21
„ 14 -	85	8	4	1	—	—	—	—	54	22	143	31
„ 21 - -	88	6	5	2	—	—	5	—	53	28	151	36
„ 28 -	90	7	—	—	—	—	12	4	57	24	159	35
April 4 - -	108	13	4	2	—	—	13	6	68	23	193	44
„ 11 -	135	16	8	3	2	2	4	—	50	22	199	43
„ 18 - -	107	7	5	3	—	—	14	2	46	22	172	34
„ 25 - -	99	10	5	1	—	—	15	3	38	14	157	28
May 2 - -	60	1	1	—	—	—	6	2	32	11	99	14
„ 9 - -	62	9	—	—	—	—	5	2	26	12	93	23
„ 16 - -	39	4	—	—	—	—	4	3	21	12	64	19
„ 23 - -	25	2	3	2	—	—	4	2	15	5	47	11
„ 30 - -	31	1	1	1	—	—	2	1	18	8	52	11
June 6 - -	34	—	1	—	—	—	—	—	12	6	47	6
" 13 - -	16	1	—	—	—	—	—	—	5	3	21	4
„ 20 - -	11	—	—	—	—	—	—	—	4	—	15	—
„ 27 - -	14	1	—	—	—	—	—	—	5	2	19	3
July 4 - -	5	—	—	—	—	—	—	—	2	1	7	1
„ 11 - -	2	—	—	—	—	—	—	—	—	—	2	—
„ 18 - -	5	2	—	—	—	—	—	—	—	—	5	2
	1,168	102	40	16	3	2	89	27	679	287	1,979	434

Table X. (Plate VII.)

Vaccination.—Condition of those Attacked with Small-pox at Ages.

Age.	Vaccinated.		Alleged Vaccination.		No Information on Vaccination.		" Under " Vaccination.		Unvaccinated.		Total Cases.	Total Deaths.
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.		
1 month and under	—	—	—	—	—	—	—	—	22	21	22	21
1 month to 1 year	—	—	—	—	—	—	10	3	53	37	63	40
1 to 5 years -	1	1	—	—	—	—	41	19	229	94	271	114
5 to 10 „ -	24	—	1	—	—	—	29	4	296	101	350	105
10 to 15 „ -	116	1	1	—	—	—	4	—	30	9	151	10
15 to 20 „ -	144	3	2	1	—	—	1	—	13	5	160	9
20 to 30 „ -	359	23	12	5	2	1	3	1	14	7	390	37
30 to 40 „ -	272	29	13	6	1	1	1	—	12	8	299	44
40 to 50 „ -	142	21	4	1	—	—	—	—	7	3	153	25
50 to 60 „	63	12	4	3	—	—	—	—	2	1	69	16
60 to 70 „ -	34	8	2	—	—	—	—	—	1	1	37	9
70 and over -	13	4	1	—	—	—	—	—	—	—	14	4
	1,168	102	40	16	3	2	89	27	679	287	1,979	434

Collated in age periods, these figures give :—

Age.	Vaccinated Class.		Unvaccinated Class.	
	Attacks.	Deaths.	Attacks.	Deaths.
1 month and under - - -	—	—	22	21
1 month to 1 year - -	—	—	63	40
1 to 10 years - - -	26	1	595	218
10 to 30 „ - - -	636	34	65	22
30 and over - - -	549	85	23	13
	1,211	120	768	4

so that the case mortality in each class at each age period was :—

Age.	Vaccinated Class.	Unvaccinated Class.
1 month and under - -	—	95·4 per cent.
1 month to 1 year - - -	—	63·5 „
1 to 10 years - - -	3·8 per cent.	36·6 „
10 to 30 „ - - -	5·3 „	33·8 „
30 and over - - - -	15·4 „	56·5 „

There were no vaccinated infants under one year of age attacked with small-pox, and 25 children below the age of 10 years.* The youngest of these was a female child, (No. 1,695), four years old, who was attacked with small-pox on May 7th, she having been vaccinated on April 15th. The case therefore approximates closely to those in the group "under vaccination," but assuming that in her case the incubation period was of the usual extent, it has not been included in that category. The vaccination was performed in three places, three weeks before the attack of small-pox commenced, and when I saw the child a few days later there were three inflamed vaccinal sites covered by dark scabs. The eruption was then profuse, but was more marked on the arms than on the face. Although severe in type, I did not then anticipate that the case would end fatally. Death took place on the 10th day of illness. It is noteworthy, that when this child was vaccinated her mother was severely ill, and a younger child was attacked 10 days after the death of its sister. Another case of a young vaccinated subject being attacked severely with small-pox is that of W. H., seven years of age (No. 1,144). He was one of a family of seven, all of the five children being attacked. Two of these children (Nos. 1,287 and 1,288) were unvaccinated, aged five and three years respectively, they both died, the youngest having a malignant attack. A boy of 12 (No. 757), the first to be attacked, and a girl of nine years (No. 1,143), had quite mild attacks. They, like W. H., were vaccinated. He had four large foveate cicatrices. His attack was a confluent one and left his face much pitted. The third example of confluent small-pox in a vaccinated child under 10 years is the case of W. W., a boy of eight years of age (No. 1,607), who had two faintly marked cicatrices of his infantile vaccination. He was one of a family of nine, all vaccinated; five of them being attacked with small-pox, this boy being the last. His attack was a confluent one, as also was those of his brothers (Nos. 412 and 1,127), but a sister aged 11 had a mild attack.†

In severe cases the vaccination marks are often obscured by the eruption, and hence many vaccinated persons are to be found in the next group, that of "alleged" vaccination. It is right to add that, except in the case of young subjects under 20, and of all those seen in hospital, there was no systematic verification of the statement made by the patient or his (or her) attendants. It is possible that had this been done, the "alleged" group might have been considerably larger.

There are 1,168 cases included in the "vaccinated" list, of which 102 were fatal, a mortality of 8·7 per cent. If to these be added 40 "alleged" cases (16 deaths), and three of whom no information at all upon vaccination was obtainable, there would be in all 1,211 cases with 120 deaths, a mortality of nearly 10 per cent.

Other analyses as to age and type of attack may be made from the three tables appended.

---

* Also one, No. 1,527, "alleged" to have been vaccinated, coherent attack.

† Reference to the Table of Cases will afford particulars of the other cases under 10 years of age. One was coherent (No. 1,117), four discrete cases, namely, (Nos. 821, 1,185, 1,584, 1,896), and 17 mild in type (Nos. 307, 501, 513, 578, 603, 776, 862, 867, 928, 1,008, 1,053, 1,143, 1,347, 1,721, 1,725, 1,765, 1,958.)

The Vaccinated Class.

A.—*Vaccinated.*

Table XI. (Plate VIII.)

Age and Type of Attack.

Age.	Malignant.		Confluent.		Coherent.		Discrete.		Mild.		Total Cases.	Total Deaths.
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.		
1 to 5 years -	—	—	1	1	—	—	—	—	—	—	1	1
5 to 10 „ -	—	—	2	—	1	—	4	—	17	—	24	—
10 to 15 „ -	—	—	11	1	3	—	31	—	71	—	116	1
15 to 20 „ -	3	3	16	—	7	—	49	—	69	—	144	3
20 to 30 „ -	7	7	67	16	38	—	110	—	137	—	359	23
30 to 40 „ -	6	6	69	23	36	—	69	—	92	—	272	29
40 to 50 „ -	11	11	28	9	16	—	41	1	46	—	142	21
50 to 60 „ -	1	1	16	10	9	1	21	—	16	—	63	12
60 to 70 „ -	1	1	8	7	3	—	8	—	14	—	34	8
70 and over -	—	—	5	3	—	—	3	1	5	—	13	4
	29	29	223	70	113	1	336	2	467	—	1,168	102

So that *at all ages* amongst those known to have been vaccinated in infancy there were of—

Malignant attacks - - -	2·4	per cent.
Confluent „ - - -	19·1	„
Coherent „ - - -	9·6	„
Discrete „ - - -	28·7	„
Mild attacks - - - -	40·0	„

Whilst at periods *under* 10 *years of age* there were 17 *mild* attacks out of a total of 25, or 68 per cent.; 5 coherent and discrete attacks, or 20 per cent., and 3 confluent, or 12 per cent.

Re-vaccination.—The proportion of individuals attacked with small-pox who were said to have been re-vaccinated was considerable.

It will be seen from the annexed list which has been extracted from the general table of cases that 190 fall into this category.

Of these, however, there is positive evidence that the re-vaccination was unsuccessful in 62 instances; and this number probably falls short of the real number of failures, as in the cases of those who had been re-vaccinated some years previously, or had died, only oral evidence was obtained.

Assuming that all these were to be regarded as re-vaccinated subjects, the number 128, may be grouped in three categories:—

1.—Re-vaccination, in previous years.
2.— „ 3 months to 14 days from attack of small-pox.
3.— „ within 14 days of attack.

To the *first* category belong 37 persons, viz., 15 to 20, 1; 20 to 30, 7; 30 to 40, 14; 40 to 50, 10; 50 to 60, 2; 60 to 70, 2; 70 and over, 1.

Of these 2 died, the types of attack being confluent 7, coherent 4, discrete 5, mild 21.

To the *second* category belong 8 persons, viz., 10 to 15, 2; 20 to 30 years, 6. There were no deaths, the attacks being discrete, 3; mild, 5 (including one case of inoculated small-pox).

To the *third* category there belong 83 persons, viz., 5 to 10, 1; 10 to 15, 17; 15 to 20, 12; 20 to 30, 18; 30 to 40, 15; 40 to 50, 11; 50 to 60, 5; 60 to 70, 3; 70 and over, 1.

There were 4 deaths, and the types were confluent, 9; coherent, 7; discrete, 29; mild, 38.

Table XII.

List of Persons Attacked with Small-Pox who had been Re-Vaccinated.

—	No. in Register.	Name.	Sex.	Age.	Type of Attack.	Result.	Vaccination Scars.	Re-vaccination.		Remarks.
								Prior to Attack.	Result.	
1	82	M. S.	F.	19	Mild	R.	4 plain	2 years ago	—	
2	84	A. P.	F.	12	Mild	R.	4 „	3 days	Nil.	
3	86	S. M.	F.	49	Malignant	D.	3 „	20 years ago	Nil.	
4	92	M.A.McC.	F.	25	Discrete	R.	3 faint	In youth	—	
5	140	M. P.	F.	40	Coherent	R.	—	"Once"	—	
6	223	G. M.	M.	28	Mild	R.	2 faint	14 days and 8 days	Nil.	
7	246	E. B.	F.	56	Mild	R.	3 plain	42 years	—	
8	281	H. K.	F.	39	Confluent	R.	No marks	10 days	Nil.	
9	298	F. M.	F.	34	Confluent	R.	—	2 days	—	
10	299	— H.	F.	43	Mild	R.	—	20 years	—	
11	313	C. P.	M.	30	Mild	R.	—	Twice; last time 7 years.	—	
12	326	H. M.	M.	14	Mild	R.	—	Recent	1	
13	345	S. N. I.	M.	40	Confluent	D.	—	At 20 to 30 twice; first successful.	—	In prison service.
14	348	G. B.	M.	46	Discrete	R.	6 marks	20 years	—	
15	379	J. T.	M.	38	Discrete	R.	—	Since onset	Nil.	Small-pox 23 years ago.
16	381	E. F.	F.	41	Confluent	R.	—	26 years	Nil.	
17	385	M. M.	F.	35	Mild	R.	5 faint	20 years	—	
18	418	A. L.	F.	67	Confluent	R.	—	10 years	—	
19	432	A. B.	M.	36	Mild	R.	4 faint	23 years	—	
20	454	E. G.	F.	34	Mild	R.	—	18 years	—	
21	472	F. C.	M.	23	Discrete	R.	—	5 days	—	
22	473	L. C.	F.	14	Discrete	R.	4 plain	5 days	Nil.	
23	483	M. P.	F.	40	Mild	R.	—	12 years	—	
24	531	H. A. P.	M.	30	Discrete	R.	—	During illness	Nil.	
25	535	G. H. T.	M.	24	Mild	R.	—	Same day	Nil.	
26	560	E. T.	F.	32	Discrete	R.	—	11 years	—	
27	579	A. M.	M.	11	Mild	R.	—	Recent	—	1 insertion.
28	582	M. S.	F.	27	Confluent	R.	5 (1 faint)	14 years	—	
29	585	G. S.	M.	12	Mild	R.	—	Recent	—	
30	609	T. M.	M.	14	Discrete	R.	—	Same day	—	
31	626	J. M.	M.	38	Confluent	R.	—	7 years	Nil.	
32	629	W. G.	M.	66	Mild	R.	—	2 years	Nil.	
33	632	W. M.	M.	12	Mild	R.	—	Same day	—	
34	649	F. P.	M.	36	Mild	R.	—	Twice	Nil.	
35	650	M. A. P.	F.	35	Mild	R.	—	1 day	—	
36	667	E. W.	F.	31	Discrete	R.	—	4 days	2	
37	677	R. H.	F.	11	Discrete	R.	—	6 days	—	
38	688	A. C.	M.	45	Discrete	R.	—	20 years	—	
39	705	A. W.	F.	29	Discrete	R.	—	2 days	—	
40	730	A. B.	M.	12	Discrete	R.	4 faint	3 days	1	
41	754	C. L.	F.	23	Confluent	R.	—	Date ?	—	
42	762	A. C.	F.	28	Mild	R.	—	3 days	—	
43	763	E. T.	M.	22	Mild	R.	—	"Twice"	—	
44	764	E. C.	F.	43	Discrete	R.	—	6 days	—	
45	765	E. B.	F.	24	Coherent	R.	—	7 years	—	
46	768	E. C.	F.	34	Confluent	D.	—	13 days	—	
47	807	M. M.	F.	24	Mild	R.	—	4 days	—	
48	810	A. M.	F.	22	Mild	R.	—	6 days	—	
49	813	L. J.	F.	24	Discrete	R.	—	"Day of rash"	Nil.	
50	822	F. B.	M.	11	Mild	R.	4 scars	Same day	—	
51	830	A. E. P.	F.	13	Mild	R.	4 „	3 days	—	
52	867	L. W.	F.	9	Mild	R.	2 faint	5 days	—	
53	887	J. O.	M.	14	Mild	R.	—	12 days ?	—	
54	911	E. A.	F.	38	Discrete	R.	—	1 day	—	
55	936	J. H. F.	M.	56	Discrete	R.	—	About 2 days	—	
56	939	K. C.	F.	35	Mild	R.	—	20 years	—	
57	962	L. L.	F.	15	Mild	R.	3 plain	2 days	4	
58	964	W. W.	M.	42	Discrete	R.	—	9 days	—	
59	965	F. W.	M.	10	Discrete	R.	—	10 days	—	
60	974	J. L.	M.	28	Mild	R.	—	Day after	Nil.	
61	977	J. F.	M.	34	Coherent	R.	—	20 years	Nil.	
62	1,004	L. M.	F.	26	Coherent	R.	—	10 days ?	—	
53	1,034	J. S.	M.	49	Mild	R.	—	3 months	Nil.	
64	1,041	W. W.	M.	35	Confluent	D.	2 plain	7 years	—	Re-vaccinated in army.
65	1,048	L. P.	F.	39	Confluent	D.	—	10 days ?	—	
66	1,064	H. S.	M.	44	Coherent	R.	—	3 days	—	
67	1,065	S. H.	F.	52	Confluent	R.	—	6 days	3	
68	1,075	A. M.	M.	37	Discrete	R.	—	13 years	—	
69	1,077	J. H.	M.	36	Mild	R.	—	16 days after onset	2	
70	1,078	M. E.	F.	13	Mild	R.	—	Recent	Nil.	
71	1,083	H. D.	M.	18	Discrete	R.	4 plain	6 days	2	
72	1,086	A. S.	F.	19	Mild	R.	—	1 day	Nil.	
73	1,090	A. B.	M.	13	Mild	R.	—	Same day	1	
74	1,095	E. M. L.	F.	15	Mild	R.	—	10 days ?	—	
75	1,100	W. H.	M.	14	Discrete	R.	—	13 days	—	
76	1,109	A. P.	M.	28	Mild	R.	8 scars	18 years	—	

—	No. in Register.	Name.	Sex.	Age.	Type of Attack.	Result.	Vaccination Scars.	Re-vaccination.		Remarks.
								Prior to Attack.	Result.	
77	1,112	E. T.	F.	32	Coherent	R.	—	18 years	—	
78	1,134	L. P.	M.	39	Mild	R.	—	8 years	—	
79	1,141	M. W.	F.	66	Mild	R.	—	33 years	—	
80	1,163	W. S.	M.	28	Confluent	D.	—	7 days	Nil.	
81	1,165	A. H.	M.	31	Mild	R.	—	6 days	—	
82	1,166	— B.	F.	72	Mild	R.	—	6 days	—	
83	1,205	E. D.	F.	39	Confluent	D.	—	Same day	—	
84	1,218	D. M.	M.	44	Confluent	R.	—	30 years	—	
85	1,227	E. M.	F.	12	Mild	R.	—	Recent	Nil.	
86	1,236	F. B.	F.	36	Mild	R.	—	20 years	—	
87	1,241	E. C.	F.	16	Confluent	R.	—	7 days	1	
88	1,243	J. C. E.	M.	43	Mild	R.	—	20 years	—	
89	1,266	— P.	F.	73	Mild	R.	—	"Often"	—	
90	1,273	E. S.	F.	56	Discrete	R.	—	7 days?	—	
91	1,275	W. F.	M.	40	Confluent	D.	—	2 days	—	
92	1,299	L. E. S.	M.	15	Coherent	R.	4 small	4 days	1	
93	1,301	C. D.	F.	15	Mild	R.	—	11 days	3	
94	1,305	M. M.	F.	60	Mild	R.	—	20 years and 7 days	4	
95	1,307	F. E. S.	F.	22	Mild	R.	—	Day after	—	
96	1,310	P. H. P.	M.	32	Mild	R.	—	12 days	—	
97	1,313	W. G.	M.	17	Discrete	R.	—	3 days	1	
98	1,315	J. A.	M.	40	Mild	R.	—	2 or 3 times	Nil.	
99	1,320	G. P.	F.	28	Mild	R.	—	5 and 7 weeks	Nil.	
100	1,321	J. C.	M.	26	Coherent	R.	—	Day of rash	Nil.	
101	1,351	T. A. S.	M.	14	Mild	R.	4 foveate	8 days	2	Previous attempt, nil.
102	1,353	P. J.	M.	28	Mild	R.	—	7 days	—	
103	1,364	M. L.	F.	30	Confluent	R.	—	1 day	1	
104	1,369	E. P.	M.	18	Mild	R.	—	Recent	Nil.	
105	1,371	F. P.	M.	30	Mild	R.	—	5 days	—	
106	1,376	E. S.	F.	30	Mild	R.	—	3 days	Nil.	
107	1,379	J. C.	M.	14	Mild	R.	—	5 days	—	
108	1,380	A. G.	M.	29	Mild	R.	—	1 month	Nil.	
109	1,396	W. S.	M.	33	Mild	R.	1 faint	8 days	4	
110	1,415	E. W.	M.	19	Discrete	R.	—	5 days	—	
111	1,419	A. A.	F.	14	Mild	R.	—	4 days	—	
112	1,422	E. B.	F.	40	Discrete	R.	—	Same day	1	
113	1,424	A. O.	F.	42	Mild	R.	3 faint	22 years	2	
114	1,425	W. O.	M.	22	Mild	R.	—	8 days	4	
115	1,430	J. D.	M.	24	Mild	R.	—	Same day	—	
116	1,436	H. K.	M.	16	Discrete	R.	3 faint	1 day	—	
117	1,441	E. D.	F.	61	Mild	R.	—	52 years and 5 days	—	
118	1,443	J. C.	M.	25	Mild	R.	—	4 months	Nil.	
119	1,448	J. L.	M.	11	Mild	R.	—	20 days	—	
120	1,449	R. F.	M.	40	Discrete	R.	2 plain	7 days	Nil.	
121	1,450	M. G.	F.	28	Discrete	R.	6 scars	6 days	—	
122	1,456	A. S.	F.	18	Mild	R.	—	6 weeks	Nil.	
123	1,459	G. L.	M.	31	Mild	R.	2 small	2½ months	Nil.	
124	1,460	T. P.	M.	33	Discrete	R.	—	1 day	1	
125	1,461	W. L.	M.	20	Mild	R.	—	2 days after	—	
126	1,487	H. H.	M.	25	Discrete	R.	—	19 days	1	
127	1,495	J. B.	M.	21	Confluent	R.	—	5 days	1	
128	1,499	E. P.	F.	42	Mild	R.	—	6 days	—	
129	1,502	D. T.	M.	44	Discrete	R.	—	10 days	1	
130	1,526	L. L.	F.	16	Discrete	R.	4 scars	3 days	1	
131	1,539	A. M.	M.	20	Discrete	R.	4 good	6 days	3	
132	1,540	T. T.	M.	32	Confluent	R.	—	8 days	Nil.	
133	1,550	W. P.	M.	24	Discrete	R.	3 scars	4 days	3	
134	1,554	J. G.	M.	17	Mild	R.	4 scars	7 years and day of rash.	—	
135	1,563	A. Y.	F.	21	Mild	R.	4 foveate	11 years	Nil.	
136	1,572	E. R.	F.	31	Confluent	R.	—	3 days	Nil.	
137	1,576	E. F.	M.	22	Mild	R.	—	3 weeks	—	
138	1,578	P. V.	M.	55	Coherent	R.	—	4 days	4	
139	1,588	E. R.	M.	43	Coherent	R.	—	15 days	Nil.	
140	1,594	E. B.	M.	38	Coherent	R.	—	6 days	Nil.	
141	1,595	S. H.	F.	23	Mild	R.	—	6 days	Nil.	
142	1,596	J. W.	M.	23	Discrete	R.	—	7 days	1	
143	1,599	W. G.	M.	15	Discrete	R.	—	9 and 1 day	Nil.	
144	1,603	A. V.	F.	15	Mild	R.	—	3 days	1	
145	1,609	W. M.	M.	52	Mild	R.	—	3 days	3	
146	1,616	J. G. W.	M.	21	Discrete	R.	3 foveate	Twice	Nil.	
147	1,620	G. E.	M.	25	Confluent	R.	—	4 days	Nil.	
148	1,624	A. F.	F.	39	Confluent	R.	—	3 weeks	Nil.	
149	1,627	S. P.	F.	40	Coherent	R.	3 plain	3 weeks	Nil.	
150	1,628	S. R.	F.	52	Mild	R.	—	47 years	—	
151	1,643	C. W. T.	M.	15	Mild	R.	2 scars	4 weeks	Nil.	
152	1,649	M. A. J.	F.	45	Coherent	R.	—	8 days	Nil.	Small-pox in infancy.
153	1,650	M. D.	F.	48	Discrete	R.	3 faint	4 days	1	
154	1,651	N. E.	F.	11	Mild	R.	4 smooth	9 days	2	
155	1,652	J. T.	M.	49	Discrete	R.	—	8 days	1	
156	1,655	G. McK.	M.	39	Coherent	R.	—	6 days	—	
157	1,669	L. P.	F.	22	Discrete	R.	—	4 days	3	
158	1,675	J. B.	M.	60	Discrete	R.	2 faint	10 days	3	Small-pox at 13.
159	1,676	E. A. B.	F.	30	Coherent	R.	—	1 day	2	
160	1,678	E. J.	F.	48	Mild	R.	—	18 and 9 years	—	
161	1,713	A. H.	M.	40	Confluent	D.	3 faint	24 years	Nil.	
162	1,715	S. T.	M.	13	Mild	R.	—	Twice recently	Nil.	
163	1,716	W. M.	M.	38	Coherent	R.	—	5 days	Nil.	

—	No. in Register.	Name.	Sex.	Age.	Type of Attack.	Result.	Vaccination Scars.	Re-vaccination. Prior to Attack.	Re-vaccination. Result.	Remarks.
164	1,731	C. C.	M.	21	Mild	R.	4 plain	2 months	Nil.	
165	1,733	D. J. W.	M.	27	Discrete	R.	6 scars	5 weeks	Nil.	
166	1,738	J. B.	M.	27	Coherent	R.	—	2 days	—	
167	1,760	J. A.	M.	46	Mild	R.	—	7 days	2	
168	1,769	A. P.	M.	44	Mild	R.	6 scars	20 years	—	
169	1,770	A. H.	M.	16	Mild	R.	—	1 and 2 months	Nil.	
170	1,772	J. B.	M.	29	Discrete	R.	1 foveate	9 weeks	3	Result very imperfect (*see* list of cases).
171	1,785	E. Y.	F.	24	Mild	R.	—	5 weeks	1	
172	1,791	C. H.	M.	16	Discrete	R.	—	5 weeks	Nil.	
173	1,792	G. H.	M.	26	Mild	R.	—	6 weeks	Nil.	
174	1,806	L. C.	F.	22	Mild	R.	—	6 weeks	2	Inoculated small pox.
175	1,809	R. B.	M.	23	Discrete	R.	—	6 weeks twice	Nil.	
176	1,824	C. H.	M.	14	Discrete	R.	2 fair	2 months	Nil.	
177	1,827	W. S.	M.	25	Mild	R.	2 faint	8 days	Nil.	
178	1,830	E. N.	F.	22	Mild	R.	—	3 weeks	Nil.	
179	1,841	E. G.	F.	27	Coherent	R.	—	13 years	—	
180	1,842	E. A. L.	F.	33	Discrete	R.	—	4 years	Nil.	
181	1,863	W. D.	M.	23	Discrete	R.	4 foveate	4 months	Nil.	
182	1,873	B. B.	F.	21	Discrete	R.	—	2 months	—	
183	1,876	A. T.	F.	39	Mild	R.	—	2 months	Nil.	
184	1,892	T. P.	M.	38	Confluent	R.	—	14 years	1	
185	1,927	M. D.	F.	19	Discrete	R.	3 foveate	6 weeks	Nil.	
186	1,929	A. M. S.	F.	31	Mild	R.	—	20 years	—	
187	1,941	M. A. F.	F.	60	Mild	R.	3 foveate	20 years	Nil.	
188	1,963	H. M.	M.	14	Mild	R.	4 ,,	3 months	1	
189	1,964	A. W.	M.	45	Mild	R.	4 ,,	2 months	Nil.	
190	1,965	A. T.	F.	42	Mild	R.	3 ,,	20 years	Nil.	

B.—*Alleged Vaccination.*

TABLE XIII. (PLATE VIII.)

Age.	Malignant.		Confluent.		Coherent.		Discrete.		Mild.		Total	Total
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
5 to 10 years	—	—	—	—	1	—	—	—	—	—	1	—
10 to 15 ,,	—	—	1	—	—	—	—	—	—	—	1	—
15 to 20 ,,	1	1	1	—	—	—	—	—	—	—	2	1
20 to 30 ,,	2	2	7	3	1	—	1	—	1	—	12	5
30 to 40 ,,	3	3	7	3	1	—	2	—	—	—	13	6
40 to 50 ,,	—	—	3	1	—	—	1	—	—	—	4	1
50 to 60 ,,	1	1	2	2	—	—	1	—	—	—	4	3
60 to 70 ,,	—	—	—	—	—	—	—	—	2	—	2	—
70 and over	—	—	—	—	1	—	—	—	—	—	1	—
	7	7	21	9	4	—	5	—	3	—	40	16

The proportionate severity of attacks in this group at all ages was :—

Of malignant attacks	17·5 per cent.
Of confluent ,,	52·5 ,,
Of coherent ,,	10.0 ,,
Of discrete ,,	12·5 ,,
Of mild attacks	7·5 ,,

There was only one under the age of 10 years; this was a coherent attack.

N.B. — Except in malignant and confluent cases, the total absence of any vaccination scars was certain.

C.—*No information as to Vaccination.*

In three cases I have no particulars as to the vaccination condition of the individuals attacked, viz., Nos. 2, 1,154, and 1,074. They all fall between the ages of 20 and 30, two being fatal cases, one of malignant, the other of confluent type.

THE UNVACCINATED CLASS.

For purposes of statistical comparison it has seemed right to include within the "Unvaccinated Class" those who were "undergoing vaccination" when attacked by the disease. A list of the cases is appended, and as their general mortality is somewhat lower than that of those who had never undergone vaccination (even recently) it would appear as if some influence on the disease must have been exerted by the vaccination in a certain proportion of the cases.

A.—*Under Vaccination.*

TABLE XIV. (PLATE VIII.)

Age.	Malignant.		Confluent.		Coherent.		Discrete.		Mild.		Total Cases.	Total Deaths.
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.		
1 month to 1 year	—	—	3	3	1	—	2	—	4	—	10	3
1 to 5 years -	1	1	26	18	3	—	7	—	4	—	41	19
5 to 10 „ -	1	1	8	3	12	—	5	—	3	—	29	4
10 to 15 „ -	—	—	1	—	1	—	—	—	2	—	4	—
15 to 20 „ -	—	—	—	—	—	—	1	—	—	—	1	—
20 to 30 „ -	—	—	3	1	—	—	—	—	—	—	3	1
30 to 40 „ -	—	—	1	—	—	—	—	—	—	—	1	—
	2	2	42	25	17	—	15	—	13	—	89	27

Eighty-nine of those attacked with small-pox had been vaccinated within a fortnight of their falling ill, in 20 cases the vaccination being performed either at or shortly after the actual onset of the disease. The majority (70 out of 89) were children below the age of 10. There were 27 deaths, a mortality of 30·3 per cent.

In addition to these there were others who were submitted to primary vaccination during the incubation period but in whom the vaccination did not take. They are included in the "unvaccinated" series, with which for general statistical comparison the above 89 cases may also be comprised.

TABLE XV.

SMALL-POX ATTACKS whilst undergoing PRIMARY VACCINATION.

—	Reference in Register	Name.	Age.	Small-Pox.		Date of Vaccination.	Number of Insertions.	Day before Attack on which Vaccinated.	Type of Attack.	Result.	Remarks.
				Onset.	Rash.						
1	70	W. T. -	5	January 22	January 24	7 days	4 vesicles	5th	Mild - -	R.	
2	201	E. C. -	4	February 22	February 24	February 19	—	3rd	Confluent -	D.	
3	217	E. K. T. -	3	„ 24	„ 29	„ 19	—	5th	Discrete -	R.	Rash abortive.
4	262	A. H. -	10	„ 28	March 1	„ 29	—	—	Mild - -	R.	Concurrent.
5	263	E. H. -	4	„ 28	„ 1	„ 29	—	—	Confluent -	D.	Do.
6	321	A. S. -	3	—	—	April 6	—	—	Confluent -	R.	
7	508	W, H. A. -	7	March 14	March 17	March 14	—	—	Coherent -	R.	Concurrent
8	553	W. R. -	8	„ 13	„ 15	„ 12	—	1st	Confluent -	R.	
9	589	C. D. -	10	„ 18	„ 20	„ 9	—	9th	Coherent -	R.	
10	606	M. B. -	4	„ 20	„ 22	„ 22	—	—	Confluent -	D.	Concurrent.
11	624	A. M. -	5	„ 23	„ 24	„ 19	—	3rd	Coherent -	R.	
12	635	A. M. -	2	„ 21	„ 23	„ 19	—	2nd	Mild - -	R.	
13	636	F. M. -	3	„ 19	„ 21	„ 19	—	—	Mild - -	R.	Concurrent.
14	665	R. M. -	4	„ 24	„ 26	„ 19	—	5th	Confluent -	D.	
15	673	E. C. -	2	„ 21	„ 23	„ 19	—	2nd	Confluent -	R.	
16	695	V. M. -	$\frac{3}{12}$	„ 26	„ 26	„ 7	—	19th	Mild - -	R.	A doubtful case.
17	698	M. W. -	5	„ 29	April 1	„ 22	4 vesicles	7th	Discrete -	R.	

—	Reference in Register	Name.	Age.	Small-Pox.		Date of Vaccination.	Number of Insertions.	Day before Attack on which Vaccinated.	Type of Attack.	Result.	Remarks.
				Onset.	Rash.						
18	753	M. G.	2	March 24	March 27	March 16	4 vesicles	8th	Discrete	R.	
19	774	L. M.	5	,, 26	,, 28	,, 21	—	5th	Confluent	D.	
20	793	E. E.	2	,, 25	,, 27	,, 18	1 vesicle	7th	Coherent	R.	
21	815	C. C.	3	,, 28	,, 30	,, 28	—	—	Confluent	D.	Concurrent.
22	823	B. B.	3	,, 27	,, 30	,, 27	—	—	Confluent	D.	Do.
23	827	R. K.	8	?	?	,, 1	—	?	Coherent	R.	
24	829	E. P.	$\frac{3}{12}$	,, 29	,, 30	,, 24	—	5th	Confluent	D.	
25	837	B. C.	4	,, 28	,, 30	,, 28	—	—	Confluent	D.	Concurrent.
26	851	V. G.	3	April 28	April 30	April 22	2 vesicles	6th	Coherent	R.	Many small pustules.
27	860	J. H.	4	March 28	March 30	March 20	—	8th	Confluent	D.	
28	864	F. W.	7	,, 24	,, 26	,, 16	—	8th	Mild	R.	
29	868	H. H.	2	,, 24	,, 26	,, 25	—	—	Confluent	D.	Concurrent.
30	871	F. K.	5	,, 25	,, 27	,, 25	—	—	Discrete	R.	Do.
31	884	E. C.	5	,, 29	April 2	,, 28	—	1st	Confluent	R.	
32	916	E. P.	4	,, 29	,, 2	,, 31	—	—	Coherent	R.	Concurrent.
33	952	A. C.	2	April 2	,, 4	,, 26	—	7th	Discrete	R.	
34	963	M. W.	6	,, 4	,, 5	,, 25	—	10th	Coherent	R.	
35	1,000	G. H.	7	March 30	,, 1	April 1	—	—	Confluent	D.	Concurrent.
36	1,009	B. C.	4	April 2	,, 4	March 26	—	7th	Discrete	R.	
37	1,010	E. C.	5	,, 5	,, 7	,, 18	—	8th	Mild	R.	
38	1,089	P. K.	$\frac{5}{12}$	March 31	,, 2	,, 25	—	6th	Discrete	R.	
39	1,159	S. B.	4	?	?	"A few days"	2 vesicles	?	Confluent	R.	Rapid subsidence of rash.
40	1,173	C. G.	9	April 11	April 13	March 29	—	13th	Coherent	R.	
41	1,176	L. L.	1	,, 12	,, 14	April 12	—	—	Confluent	R.	Concurrent.
42	1,183	J. J.	20	,, 9	,, 11	,, 8	—	1st	Confluent	R.	
43	1,191	H. H.	5	,, 10	,, 12	,, 9	—	1st	Confluent	R.	
44	1,195	C. P.	4	,, 13	,, 14	,, 3	—	10th	Mild	R.	
45	1,196	L. B.	2	March 19	March 21	March 16	—	3rd	Mild	R.	
46	1,254	J. R.	26	April 13	April 15	April 14	—	—	Confluent	D.	Concurrent.
47	1,290	E. L.	10	,, 12	,, 14	,, 12	—	—	Confluent	R.	Do.
48	1,314	V. S.	6	,, 11	,, 13	,, 11	—	—	Coherent	R.	Do.
49	1,324	A. J.	3	,, 15	,, 17	,, 11	—	4th	Discrete	R.	Rash abortive.
50	1,325	A. D.	3	,, 12	,, 14	,, 12	—	—	Discrete	R.	Concurrent.
51	1,330	L. P.	6 wks.	,, 13	,, 15	,, 6	—	7th	Mild	R.	
52	1,337	W. S.	1	,, 16	,, 18	,, 23	—	7th	Confluent	D.	
53	1,338	A. W.	20	,, 16	,, 19	,, 11	4 vesicles	5th	Confluent	R.	
54	1,367	E. P.	$\frac{7}{12}$	,, 17	,, 19	,, 10	—	7th	Mild	R.	
55	1,375	H. J.	2	,, 16	,, 18	,, 9	—	7th	Confluent	R.	
56	1,386	G. C.	9	,, 20	,, 22	,, 16	4 vesicles	3rd	Coherent	R.	
57	1,399	C. W.	7	,, 16	,, 18	"10 days"	3 vesicles	8th	Confluent	R.	
58	1,414	A. C.	9	,, 19	,, 21	April 16	—	3rd	Discrete	R.	
59	1,423	D. R.	17	,, 21	,, 23	,, 21	3 vesicles	—	Discrete	R.	Concurrent.
60	1,426	T. G.	33	,, 19	,, 21	,, 15	4 vesicles	4th	Confluent	R.	
61	1,431	M. L.	6	,, 20	,, 22	,, 20	—	—	Discrete	R.	Concurrent.
62	1,446	E. R	$\frac{3}{12}$	,, 19	,, 21	,, 13	3 vesicles	6th	Mild	R.	Sparse pustules.
63	1,451	A. J. H.	10 wks.	,, 19	,, 21	,, 10	—	9th	Discrete	R.	Rash abortive.
64	1,465	W. R.	1	,, 24	,, 26	,, 16	2 vesicles	10th	Confluent	D.	
65	1,479	F. J.	4	,, 23	,, 25	Within 7 days	—	?	Confluent	D.	
66	1,484	T. E. R.	4	,, 22	,, 23	April 17	2 vesicles	5th	Confluent	D.	
67	1,494	E. M. C.	8	,, 26	,, 25	,, 18	2 vesicles	5th	Coherent	R.	
68	1,501	G. R.	7	,, 22	,, 24	,, 13	3 vesicles	9th	Coherent	R.	
69	1,521	G. W.	7	,, 25	,, 28	,, 22	3 vesicles	3rd	Malignant	D.	
70	1,536	G. C.	10	,, 21	,, 24	,, 13	3 vesicles	8th	Mild	R.	
71	1,585	C. H.	3	,, 27	,, 30	,, 24	—	3rd	Confluent	R.	
72	1,586	J. M.	3	,, 28	,, 30	,, 27	3 vesicles	1st	Confluent	D.	
73	1,587	H. P.	2	,, 28	,, 30	,, 22	—	6th	Confluent	R.	
74	1,611	E. G.	5	,, 28	,, 30	,, 24	3 vesicles	4th	Discrete	R.	
75	1,636	E. P.	$\frac{10}{12}$	May 4	May 6	May 4	4 vesicles	—	Coherent	R.	Concurrent.

—	Reference in Register	Name.	Age.	Small-Pox.		Date of Vaccination.	Number of Insertions.	Day before Attack on which Vaccinated.	Type of Attack.	Result.	Remarks.
				Onset.	Rash.						
76	1,656	E. L. J. -	4	May 6	May 7	April 24	—	14th	Malignant -	D.	
77	1,665	J. P. -	3	,, 4	,, 7	May 4	4 vesicles	—	Confluent -	R.	Concurrent.
78	1,608	J. M. -	9	,, 5	,, 7	April 30	2 vesicles	5th	Coherent -	R.	
79	1,688	A. S. -	1	,, 5	,, 9	May 4	—	1st	Confluent -	D.	
80	1,702	M. E. -	8	,, 9	,, 11	,, 6	2 vesicles	3rd	Coherent -	R.	
81	1,719	H. H. -	5	,, 10	,, 12	,, 7	—	3rd	Confluent -	D.	
82	1,722	A. C. W. -	$\frac{3}{12}$	,, 9	,, 11	,, 7	—	2nd	Confluent	D.	
83	1,739	E. W. -	$\frac{4}{12}$	,, 12	,, 15	,, 7	3 vesicles	5th	Confluent -	D.	
84	1,743	S. C. -	2	,, 15	,, 17	,, 14	—	1st	Confluent -	D.	
85	1,780	E. M. -	2	—	,, 17	,, 9	3 vesicles	7th	Discrete -	R.	
86	1,794	M. W. -	4	May 18	,, 20	,, 18	4 vesicles	—	Confluent -	D.	Concurrent.
87	1,795	H. W. -	6	,, 18	,, 20	,, 18	3 vesicles	—	Confluent -	R.	Do.
88	1,831	D. C. -	4	,, 24	,, 26	,, 19	3 vesicles	5th	Confluent -	D.	
89	1,832	E. C- -	6	,, 24	,, 26	,, 19	3 vesicles	5th	Coherent -	R.	

In a few instances the sparseness of the eruption, and its character, especially the tendency to minute, multiform papules and pustules, suggested that the vaccination had exerted a distinctly modifying influence upon the disease. In general, however, it is not possible to assert that such a result had occurred. An analysis of the foregoing table shows that of the 23 " concurrent " cases (vaccinated, that is, on the day of attack or even on one or two days after illness began) there were 9 deaths, or 39·1 per cent.; whilst of those vaccinated 14 days or fewer before the attack, and one (doubtful) case vaccinated 19 days before, there were 18 deaths out of 66 attacks, or 27·2 per cent. Nor does a scrutiny of the type of attack lead to a much different conclusion. The proportion of severe cases was slightly higher among the "concurrent" than the remainder, there being of confluent cases in the former series 56·5 per cent., as against 45·5 per cent. (confluent and malignant) in the latter. It will be seen, however, that there are certainly more discrete and mild cases amongst those vaccinated in the earlier than in those vaccinated in the later days.

—	Days before Onset of Small-Pox.														Day of Attack.	Days after Onset.	
	?	19.	14.	13.	10.	9.	8.	7.	6.	5.	4.	3.	2.	1.		1.	2.
Cases - - -	4	1	1	1	3	3	6	9	4	12	3	9	3	7	16	5	2
Deaths - -	1	—	1	—	1	—	1	1	—	6	—	3	1	3	4	4	1
Malignant - -	—	—	1	—	—	—	—	—	—	—	—	1	—	—	—	—	—
Confluent -	3	—	—	—	1	—	2	1	1	7	1	3	2	7	8	4	1
Coherent - -	1	—	—	1	1	2	—	1	1	3	—	3	—	—	3	—	1
Discrete - -	—	—	—	—	—	1	1	5	1	1	2	1	—	—	4	—	—
Mild - - -	—	1	—	—	1	—	3	2	1	1	—	1	1	—	1	1	—

The proportionate severity of attacks at all ages, and independently of the period of vaccination, were in this group :—

Of malignant cases - - - - - - -	2·2 per cent.
,, confluent ,, - - - - -	47·2 ,,
,, coherent ,, - - - -	19·1 ,,
,, discrete ,, - - - - - - -	16·8 ,,
,, mild ,, - - - - -	14·5 ,,

the majority being under the age of 10 years.

B.—*Unvaccinated.*

TABLE XVI. (PLATE VIII.)

Age.	Malignant.		Confluent.		Coherent.		Discrete.		Mild.		Indeterminate.		Total	Total
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
1 month and under	5	5	14	13	—	—	—	—	—	—	3	3	22	21
1 month to 1 year	4	4	38	32	3	1	6	—	2	—	—	—	53	37
1 to 5 years	5	5	165	89	31	—	19	—	9	—	—	—	229	94
5 to 10 ,,	12	12	219	89	29	—	27	—	9	—	—	—	296	101
10 to 15 ,,	2	2	24	7	1	—	2	—	1	—	—	—	30	9
15 to 20 ,,	—	—	9	5	2	—	1	—	1	—	—	—	13	5
20 to 30 ,,	3	3	9	4	1	—	1	—	—	—	—	—	14	7
30 to 40 ,,	3	3	6	5	2	—	1	—	—	—	—	—	12	8
40 to 50 ,,	—	—	5	3	1	—	1	—	—	—	—	—	7	3
50 to 60 ,,	—	—	1	1	—	—	1	—	—	—	—	—	2	1
60 to 70 ,,	—	—	1	1	—	—	—	—	—	—	—	—	1	1
70 and over	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	34	34	491	249	70	1	59	—	22	—	3	3	679	287

The number of the unvaccinated was 679. [If to these be added those who were "under" vaccination when infected there would be 768 of those attacked with small-pox, or about two-fifths of the whole number who had not been vaccinated previously.] Of the 679 attacked, there were 287 who died, a mortality of 42·2 per cent. [with the larger series of 768 there were 314 deaths, or 40·8 per cent.] The proportion of these "unvaccinated deaths" to the total number (434) would be as 7 to 5, whereas, as above stated, the proportion of *attacks* was as 2 to 5. The comparison would be more just if those under one year of age were excluded, which would give the following figures :—

Aged one year and upwards :—

Attacks.—"unvaccinated" series	683.
,, "vaccinated" series	1,211.
Deaths.—"unvaccinated" series	253.
,, "vaccinated" series	120.

or, in round numbers, the attacks amongst the unvaccinated would be to the total as 3 to 8, whilst the deaths would be as 5 to 8.

The great majority of the unvaccinated were children :—

Aged 1 month and under	22 cases,	21 deaths.
,, 1 month to one year	53 ,,	37 ,,
,, 1 to 10 years	525 ,,	195 ,,
,, 10 to 30 years	57 ,,	21 ,,
,, 30 years and over	22 ,,	20 ,,

The proportionate severity of attacks, at all ages, was :—

Of malignant attacks	5· per cent.
,, confluent ,,	72·3 ,,
,, coherent ,,	10·3 ,,
,, discrete ,,	8·7 ,,
,, mild ,,	3·2 ,,
,, indeterminate ,,	0·4 ,,

And of the 600 attacks in subjects under 10 years of age, there were :—

Of maligant type	4·3 per cent.
,, confluent ,,	72·6 ,,
,, coherent ,,	10·5 ,,
,, discrete ,,	8·6 ,,
,, mild ,,	3·3 ,,
,, indeterminate type	0·5 ,,

proportions which are closely parallel to those obtaining in the whole series.

Pl. VIII

TYPES OF SMALL POX ATTACKS, AND FATALITY WITH REGARD TO AGE & VACCINATION.

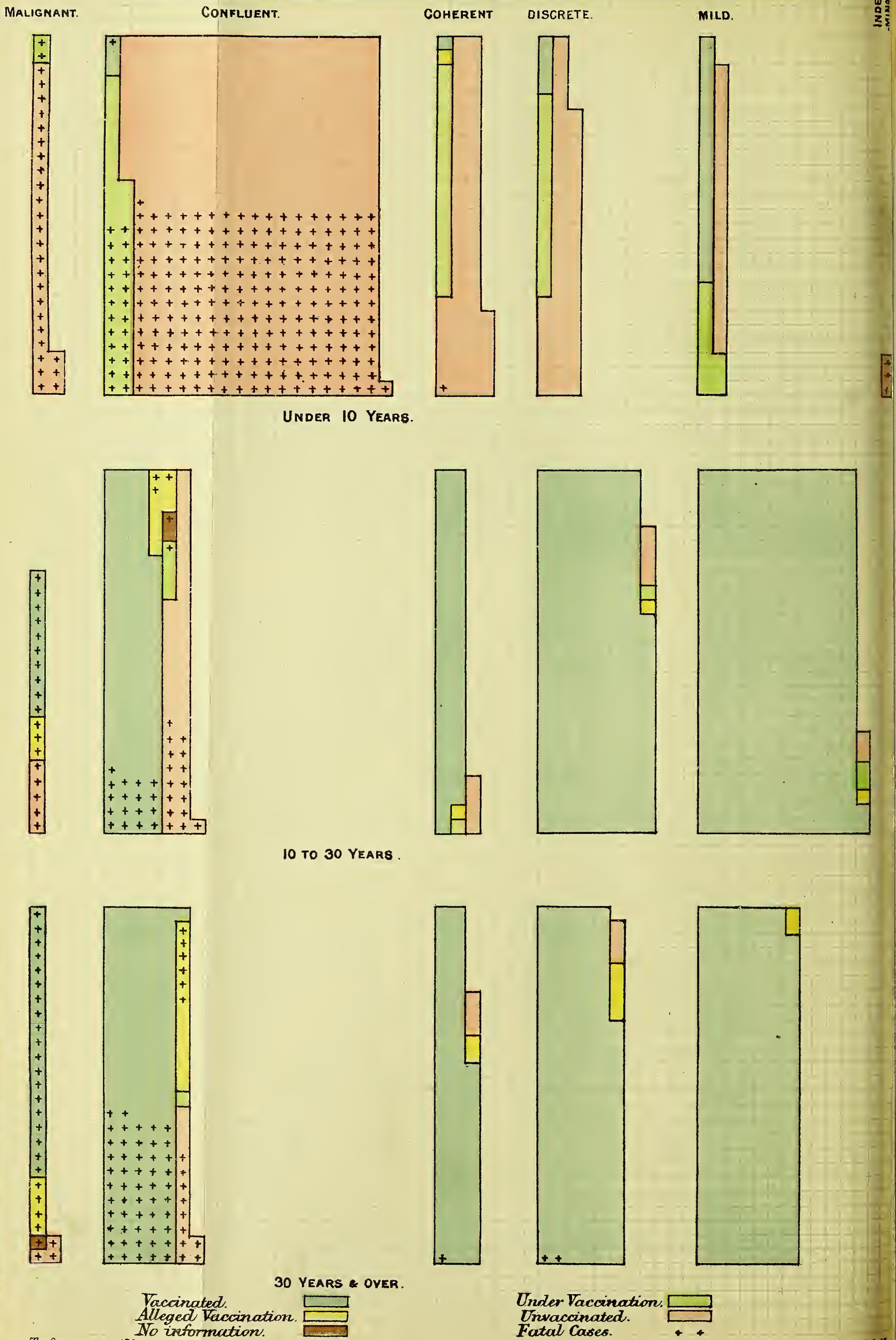


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TABLE XVII. (PLATE VIII.)

VACCINATION and TYPE of SMALL-POX.

—	Vaccinated Series.						Un-vaccinated Series.				Total	
	Vaccinated.		Alleged Vaccination.		Doubtful Vaccination.		Under Vaccination.		Unvaccinated.		Cases.	Deaths.
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.		
Under 10 years :—												
Malignant -	—	—	—	—	—	—	2	2	26	26	28	28
Confluent - -	3	1	—	—	—	—	37	24	436	223	476	248
Coherent -	1	—	1	—	—	—	16	—	63	1	81	1
Diserete - -	4	—	—	—	—	—	14	—	52	—	70	—
Mild - -	17	—	—	—	—	—	11	—	20	—	48	—
Indeterminate -	—	—	—	—	—	—	—	—	3	3	3	3
10 to 30 years :—												
Malignant -	10	10	3	3	—	—	—	—	5	5	18	18
Confluent - -	94	17	9	3	2	1	4	1	42	16	151	38
Coherent - -	48	—	1	—	—	—	1	—	4	—	54	—
Discrete - -	190	—	1	—	—	—	1	—	4	—	196	—
Mild - -	277	—	1	—	—	—	2	—	2	—	282	—
30 years and over :—												
Malignant -	19	19	4	4	1	1	—	—	3	3	27	27
Confluent - -	126	52	12	6	—	—	1	—	13	10	152	68
Coherent - -	64	1	2	—	—	—	—	—	3	—	69	1
Discrete - -	142	2	4	—	—	—	—	—	3	—	149	2
Mild - -	173	—	2	—	—	—	—	—	—	—	175	—
	1,168	102	40	16	3	2	89	27	679	287	1,979	434

The facts given in this Table are represented in the series of diagrams appended (Plate VIII.).

PART IV.

§ 15. Statistical Analysis of Small-Pox Incidence in 899 households.
Numbers exposed to Infection; of those who were attacked and of those who died.
Size of Households.—Proportionate attack-rates and case-mortality.
Age and Small-Pox Incidence.—Attack-rates.
Vaccination and Small-Pox Incidence.
Attack rates in the "Vaccinated Class" and the "Unvaccinated Class" respectively. [The "unvaccinated" include those "under vaccination."]
List of Invaded Households, with numbers of inmates, and reference to those attacked, arranged according to their vaccination condition.
Analysis of Attack-rates and Mortality in the Vaccinated and Unvaccinated Series, in relation to (*a.*) Size of Households; (*b.*) Age.
Previous Small-pox.—Numbers of those stated to have had previous attack of small-pox; and the attack-rates after the deduction of these.
§ 16. Hospital Isolation and Vaccination.

§ 15. STATISTICAL ANALYSIS OF SMALL-POX INCIDENCE IN 899 HOUSEHOLDS.

Information was obtained concerning the ages and vaccination condition of the members of 899 households. The total number of individuals in this community was 4,861, of whom 1,717 were attacked with small-pox, a rate of 35·3 per cent.

Of these 1,717 cases, 370 died, or 21·5 per cent. Thus of all exposed to infection, 7·6 per cent. died from the disease which they contracted.

Size of Households.—The number of members of each household, and the cases of small-pox arising in each are thus distributed:—

———	No. of Houses.	No. of Inmates.		Died.
		Exposed.	Attacked.	
Houses with one inmate	2	2	2	—
,, two ,,	75	150	95	11
,, three ,,	133	399	178	24
,, four ,,	142	568	207	37
,, five ,,	156	780	274	58
,, six ,,	118	708	221	52
,, seven ,,	105	735	249	65
,, eight ,,	73	584	191	49
,, nine ,,	49	441	134	30
,, ten ,,	25	250	85	17
,, eleven ,,	11	121	29	8
,, twelve ,,	7	84	44	15
,, thirteen ,,	3	39	8	4
	899	4,861	1,717	370

It will be seen that the incidence of the disease was for the most part inversely to the numbers exposed to infection in each house, but that the mortality was more variable, being highest in the larger households:—

———	Attack Rates.	Case Mortality.
	Per Cent.	Per Cent.
In houses with one inmate	100·	—
,, ,, two ,,	63·3	11·5
,, ,, three ,,	44·6	13·4
,, ,, four ,,	36·4	17·8
,, ,, five ,,	35·1	21·1
,, ,, six ,,	31·2	23·5
,, ,, seven ,,	33·8	26·1
,, ,, eight ,,	32·7	25·6
,, ,, nine ,,	30·3	22·3
,, ,, ten ,,	34·	20·
,, ,, eleven ,,	23·9	27·5
,, ,, twelve ,,	52·3	34·1
,, ,, thirteen ,,	20·5	50·

Age and Small-Pox Incidence.

The greater liability to the infection of small-pox amongst children as compared with adults is evidenced from the fact that the incidence on those under 10 years of age (1,603 exposed; 617 attacked) was 38·4 per cent.; and on those above 10 years of age (3,258 exposed; 1,076 attacked) 33 per cent. The divergence is greatest at the two extremes, thus:—

Age.	Exposed.	Attacked.	Rates.
			Per Cent.
1 month and under - -	23	20	87·
1 month to 1 year - -	144	60	41·6
1 to 10 years - -	1,436	561	39·
10 to 30 ,, - -	1,751	594	33·9
30 years and over - -	1,507	482	31·9

Vaccination and Small-Pox Incidence.

It remains to determine what influence vaccination apparently had in affording protection from an attack of small-pox.

This question may be approached from many sides, and it of course involves the consideration of the effect of re-vaccination, which was carried on to so large an extent during the progress of the epidemic. Unfortunately the data at my disposal do not afford me sure ground for correct inference on this latter head; for although note was made of every person reported to have been re-vaccinated, there is seldom any qualifying statement as to the success or failure of the vaccination. As we have already seen, a large number of the "re-vaccinated"* who contracted small-pox were individuals in whom the result of this re-vaccination was negative; it left no trace, or such imperfect indication as could not be taken for evidence of a successful vaccination. It would manifestly lead to very wrong conclusions if every individual who did *not* take small-pox, and who was said to have been re-vaccinated, were assumed to have been "successfully" re-vaccinated. I have therefore decided not to deal with this side of the matter at all, but to confine myself to the data obtained as to those who were known to have been vaccinated in infancy, including in the "vaccinated class" those who were alleged to have been vaccinated, but who showed no evidence, and those of whom only doubtful information on the point was afforded.

Again, there is a considerable number (of children chiefly) who were vaccinated either just before small-pox appeared in their families, or on its appearance. These, strictly speaking, form a class apart. They comprise the category of those "under vaccination" when attacked, of whom a list has been given above.

Yet for statistical purposes, in respect to the incidence of the disease amongst members of this class, they will be included with those who remained "unvaccinated" throughout, although I shall also give the statistics of them apart from the truly "unvaccinated."

We have, then, of those exposed to infection in households invaded by small-pox—

Of the "vaccinated class" - - - - - 3,386
,, "unvaccinated class" - - - - 1,475

There were attacked with small-pox—

Of the "vaccinated class" - - 1,028 or 30·3 per cent.
,, "unvaccinated class" - - 689 ,, 46·6 ,,

The "unvaccinated class" includes—

(*a.*) 822 who remained unvaccinated, of whom 604 were attacked.
(*b.*) 653 who were recently vaccinated, of whom 85 were attacked.

So that if this circumstance of recent vaccination be taken into account, the attack rate of the *unvaccinated* would be 73·4 per cent., and of those recently *under vaccination*, 13·0 per cent. This marked divergence can hardly be explained upon any other ground than the new factor, that of recent vaccination, introduced into those of the latter series, as in all other respects, viz., exposure to infection, age, and social status, they were precisely similar to those of the strictly unvaccinated.

---

* That is of those who were stated to have been re-vaccinated at any time of their lives up to within 14 days of contracting small-pox. (*See* p. 146.)

The following is a list of the invaded households, arranged in the order of their size, the vaccination condition of all the inmates, and then that of those who were attacked with small-pox, these latter being indicated by the numbers in the Case List (*supra*) :—

N.B.—The figures in the "attacked" column refer to the Table of Cases (*supra*). The fatal cases are indicated by thick type. An asterisk (*) denotes a previous attack of small-pox.

House.	All Inmates.			Attacked with Small-Pox.			
	Vacci-nated.	Vaccinated at and after Invasion.	Unvacci-nated.	Vaccinated.	Alleged Vaccination.	Under Vaccination.	Unvaccinated.
				Houses with One Inmate.	(2).		
831	1	—	—	1,450	—	—	—
844	1	—	—	1,474	—	—	—
				Houses with Two Inmates.	(75).		
13	2	—	—	16	—	—	—
44	2	—	—	73	—	—	—
124	2	—	—	**172**	—	—	—
193	2	—	—	287	—	—	—
262	2	—	—	392	—	—	—
264	2	—	—	394	—	—	—
267	2	—	—	**397**	—	—	—
292	2	—	—	442	—	—	—
302	2	—	—	460	—	—	—
306	2	—	—	—	**468**	—	—
315	2	—	—	483	—	—	—
339	2	—	—	521	—	—	—
343	2	—	—	531	—	—	—
365	2	—	—	573	—	—	—
377	2	—	—	597	—	—	—
378	2	—	—	—	598	—	—
398	2	—	—	645	—	—	—
399	2	—	—	**646**	—	—	—
414	2	—	—	696	—	—	—
430	2	—	—	748	—	—	—
438	2	—	—	766	—	—	—
442	2	—	—	772	—	—	—
529	2	—	—	942	—	—	—
546	2	—	—	977	—	—	—
594	2	—	—	1,049	—	—	—
596	2	—	—	**1,052**	—	—	—
642	1	—	1	—	—	—	**1,135**
676	2	—	—	1,186	—	—	—
677	1	—	1	—	—	—	**1,187**
693	2	—	—	1,211	—	—	—
698	2	—	—	1,217	—	—	—
724	2	—	—	1,264	—	—	—
736	2	—	—	1,281	—	—	—
766	1	—	1	**1,340**	—	—	—
777	2	—	—	1,353	—	—	—
793	2	—	—	1,381	—	—	—
810	2	—	—	1,407	—	—	—
878	2	—	—	1,554	—	—	—
885	2	—	—	1,567	—	—	—
893	2	—	—	1,575	—	—	—
899	2	—	—	1,594	—	—	—
902	2	—	—	1,596	—	—	—
923	2	—	—	1,630	—	—	—
928	2	—	—	1,640	—	—	—
948	2	—	—	1,669	—	—	—
986	2	—	—	**1,757**	—	—	—
1,006	2	—	—	1,809	—	—	—
1,011	2	—	—	1,815	—	—	—
1,018	2	—	—	1,828	—	—	—
1,020	2	—	—	1,830	—	—	—
1,029	2	—	—	1,842	—	—	—
1,050	2	—	—	1,872	—	—	—
1,056	2	—	—	1,886	—	—	—
1,082	2	—	—	1,933	—	—	—
1,090	2	—	—	1,949	—	—	—
60	2	—	—	93, 177	—	—	—

House.	All Inmates.			Attacked with Small-Pox.			
	Vaccinated.	Vaccinated at and after Invasion.	Unvaccinated.	Vaccinated.	Alleged Vaccination.	Under Vaccination.	Unvaccinated.
			Houses with Two Inmates. (75)—continued.				
187	2	—	—	277, 634	—	—	—
317	2	—	—	485, 375	—	—	—
349	2	—	—	545, 903	—	—	—
386	2	—	—	612, 613	—	—	—
482	2	—	—	858, 859	—	—	—
489	2	—	—	872, 1405	—	—	—
573	2	—	—	1,026, 1,463	—	—	—
614	2	—	—	1,077, 1,377	—	—	—
626	2	—	—	1,093, 1,488	—	—	—
640	2	—	—	1,131, 1,132	—	—	—
665	2	—	—	1,167, 1,618	—	—	—
666	2	—	—	1,168, 1,543	—	—	—
686	2	—	—	1,203, 1,590	—	—	—
702	2	—	—	1,221, 1,531	—	—	—
884	2	—	—	1,565, 1,726	—	—	—
933	2	—	—	1,645, 1,697	—	—	—
1,026	2	—	—	1,838, 1,920	—	—	—
1,091	2	—	—	1,950, 1,972	—	—	—
1,099	2	—	—	1,964, 1,979	—	—	—
			Houses with Three Inmates. (133).				
9	3	—	—	11	—	—	—
48	2	—	1	—	—	—	80
128	2	1	—	179	—	—	—
222	2	—	1	—	—	—	334
226	2	—	1	—	—	—	342
233	3	—	—	350	—	—	—
245	2	—	1	370	—	—	—
270	3	—	—	406	—	—	—
309	3	—	—	—	471	—	—
327	2	—	1	—	—	—	502
333	1	1	1*	—	—	508	—
348	3	—	—	546	—	—	—
383	2	1	—	—	—	606	—
390	3	—	—	617	—	—	—
408	2	—	1	—	—	—	681
459	3	—	—	807	—	—	—
469	2	1	—	825	—	—	—
470	3	—	—	834	—	—	—
487	3	—	—	869	—	—	—
491	3	—	—	876	—	—	—
493	2	—	1	—	—	—	879
497	3*	—	—	888	—	—	—
500	3	—	—	904	—	—	—
514	3	—	—	926	—	—	—
523	3	—	—	936	—	—	—
541	3	—	—	970	—	—	—
543	3	—	—	974	—	—	—
549	3	—	—	980	—	—	—
575	1	1	1	—	—	—	1,028
576	3	—	—	1,029	—	—	—
578	3	—	—	1,031	—	—	—
589	3	—	—	1,044	—	—	—
597	3	—	—	1,054	—	—	—
604	2	1	—	1,061	—	—	—
617	2	1	—	1,082	—	—	—
622	3	—	—	1,088	—	—	—
639	2	—	1	—	1,129	—	—
647	3	—	—	1,141	—	—	—
657	3	—	—	1,157	—	—	—
660	2	—	1	—	—	—	1,162
662	2	1	—	1,164	—	—	—
663	3	—	—	1,165	—	—	—
664	3	—	—	1,166	—	—	—
694	2	1	—	1,212	—	—	—
696	3	—	—	1,215	—	—	—
701	3	—	—	1,220	—	—	—
703	2	—	1	1,225	—	—	—
713	3	—	—	1,242	—	—	—

House.	All Inmates.			Attacked with Small-Pox.			
	Vaccinated.	Vaccinated at and after Invasion.	Unvaccinated.	Vaccinated.	Alleged Vaccination.	Under Vaccination.	Unvaccinated.
Houses with Three Inmates. (133)—continued.							
714	3	—	—	1,243	—	—	—
716	2	—	1	1,245	—	—	—
726	3	—	—	1,267	—	—	—
749	3	—	—	1,308	—	—	—
759	2	1	—	—	—	1,324	—
773	3	—	—	1,349	—	—	—
775	3	—	—	1,351	—	—	—
787	2	1	—	1,370	—	—	—
792	2	1	—	1,380	—	—	—
799	3	—	—	1,389	—	—	—
809	2	—	1	1,406	—	—	—
816	2	—	1	1,417	—	—	—
818	3	—	—	1,419	—	—	—
820	3	—	—	1,424	—	—	—
822	3	—	—	1,429	—	—	—
826	3	—	—	1,441	—	—	—
827	3	—	—	1,443	—	—	—
830	3	—	—	1,449	—	—	—
832	2	1	—	—	—	1,451	—
837	2	1	—	1,460	—	—	—
851	3	—	—	1,486	—	—	—
861	2	—	1	1,505	—	—	—
867	2	1	—	1,529	—	—	—
873	3	—	—	1,545	—	—	—
876	3	—	—	1,549	—	—	—
896	3	—	—	1,591	—	—	—
897	2	—	1*	1,592	—	—	—
909	2	1	—	1,604	—	—	—
919	3	—	—	1,623	—	—	—
974	2	—	1	1,728	—	—	—
978	3	—	—	1,744	—	—	—
981	2	—	1	—	—	—	1,749
982	3	—	—	1,750	—	—	—
984	3	—	—	1,755	—	—	—
994	3	—	—	1,772	—	—	—
1,002	3	—	—	1,792	—	—	—
1,004	2	1	—	—	1,800	—	—
1,007	3	—	—	1,813	—	—	—
1,012	3	—	—	1,816	—	—	—
1,024	3	—	—	1,836	—	—	—
1,032	3	—	—	1,847	—	—	—
1,033	2	—	1	1,848	—	—	—
1,039	3	—	—	1,854	—	—	—
1,051	2	—	1	—	—	—	1,874
1,058	2	—	1*	1,888	—	—	—
1,084	3	—	—	1,936	—	—	—
1,088	3	—	—	1,943	—	—	—
102	1	—	2*	1,214	—	—	148
177	2	—	1	252, 547	—	—	—
223	3	—	—	336, 992	—	—	—
243	2	1	—	367, 690	—	—	—
286	2	—	1	434, 857	—	—	—
288	2*	—	1	436	—	—	1,050
291	3	—	—	443, 765	—	—	—
325	3	—	—	496, 497	—	—	—
344	3	—	—	532, 987	—	—	—
360	3	—	—	565, 797	—	—	—
361	3	—	—	566, 1,065	—	—	—
394	3	—	—	627, 973	—	—	—
436	3	—	—	762, 763	—	—	—
437	3	—	—	764, 1,148	—	—	—
439	2	—	1	767	—	—	1,408
480	2	—	1	1,312	—	—	854
496	2	—	1	887	—	—	1,322
555	2	—	1	988, 1,442	—	—	—
591	2	—	1	1,056	—	—	1,198
605	2	—	1	1,064	—	—	1,062
645	3*	—	—	1,139, 1,577*	—	—	—
654	2	—	1	1,154†	—	—	1,412
734	3	—	—	1,279, 1,616	—	—	—

† No information.

House.	All Inmates.			Attacked with Small-Pox.			
	Vaccinated.	Vaccinated at and after Invasion.	Unvaccinated.	Vaccinated.	Alleged Vaccination.	Under Vaccination.	Unvaccinated.
Houses with Three Inmates. (133)--continued.							
776	3	—	—	1,352, 1,578	—	—	—
801	2	1	—	1,392	—	1,722	—
804	1	—	2	—	—	—	1,397, 1,635
855	3	—	—	1,495, 1,818	—	—	—
886	3	—	—	1,568, 1,797	—	—	—
985	2	—	1	1,870	—	—	1,756
998	1	1	1	1,878	—	—	1,976
1,009	2	—	1	1,905	—	—	1,802
237	2	—	1	729, 786	—	—	359
250	2	—	1	374, 803	—	—	1,130
320	2	—	1	488, 997	—	—	996
494	2	1	—	885, 1,753	—	1,484	—
536	3	—	—	950, 1,007, 1,305	—	—	—
554	2	—	1	986, 1,534	—	—	1,433
772	2	—	1	1,626, 1,686	—	—	1,348
Houses with Four Inmates (142).							
18	3	—	1	22	—	—	—
37	2	2	—	54	—	—	—
49	4	—	—	81	—	—	—
52	3*	—	1*	85	—	—	—
57	3	1	—	90	—	—	—
73	4	—	—	111	—	—	—
115	3	—	1	—	—	—	162
154	4	—	—	209	—	—	—
158	3	1	—	214	—	—	—
164	2	—	2	223	—	—	—
166	3	1	—	227	—	—	—
167	3	1	—	228	—	—	—
196	4	—	—	290	—	—	—
201	4	—	—	296	—	—	—
228	2	—	2	344	—	—	—
279	4	—	—	418	—	—	—
287	2	—	2	—	—	—	435
290	4	—	—	441	—	—	—
305	3	—	1	—	—	—	467
312	4	—	—	475	—	—	—
328	2	2	—	503	—	—	—
375	4	—	—	594	—	—	505
330	3	—	1	—	—	—	—
372	3	1	—	—	—	—	—
336	4	—	—	517	—	589	—
381	4	—	—	602	—	—	—
406	4	—	—	675	—	—	—
384	3	1	—	608	—	—	—
419	2	2	—	711	—	—	—
421	4	—	—	713	—	—	—
445	3*	—	1	775	—	—	—
446	1	1	2*	—	—	—	778
448	4	—	—	781	—	—	—
453	2	—	2	788	—	—	—
455	2	2	—	—	800	—	—
457	3	—	1	—	—	—	805
474	3	1	—	844	—	—	—
475	3	1	—	845	—	—	—
477	3	1	—	847	—	—	—
478	4	—	—	849	—	—	—
486	2	2	—	866	—	—	—
507	2	1	1	—	—	—	918
508	3	1	—	—	919	—	—
520	4	—	—	933	—	—	—
528	3	1	—	941	—	—	—
539	4	—	—	962	—	—	—
542	4	—	—	972	—	—	—
563	4	—	—	1,005	—	—	—
564	4	—	—	1,006	—	—	—
568	3	—	1	—	—	—	1,020
571	4	—	—	1,024	—	—	—
579	4	—	—	1,033	—	—	—

House.	All Inmates.			Attacked with Small-Pox.			
	Vaccinated.	Vaccinated at and after Invasion.	Unvaccinated.	Vaccinated.	Alleged Vaccination.	Under Vaccination.	Unvaccinated.
Houses with Four Inmates. **(142)**—continued.							
581	4	—	—	1,035	—	—	—
600	3	—	1	1,057	—	—	—
601	4	—	—	—	**1,058**	—	—
607	3	—	1	1,066	—	—	—
621	3	1	—	—	1,087	—	—
643	2	2	—	1,136	—	—	—
644	4	—	—	**1,137**	—	—	—
648	4	—	—	1,147	—	—	—
655	2	2	—	1,155	—	—	—
679	2	2	—	—	—	1,191	—
681	3	1	—	1,197	—	—	—
683	2	2	—	1,200	—	—	—
695	4	—	—	1,213	—	—	—
697	2*	2	—	1,216*	—	—	—
707	2	2	—	1,234	—	—	—
711	2	2	—	1,239	—	—	—
729	3	—	1	1,274	—	—	—
780	2	—	2	—	—	—	1,356
782	3	1	—	1,390	—	—	—
783	4	—	—	1,361	—	—	—
815	4	—	—	1,415	—	—	—
819	4	—	—	1,422	—	—	—
821	2	—	2	—	1,427	—	—
824	4	—	—	**1,438**	—	—	—
825	2	2	—	1,440	—	—	—
848	3	—	1	1,482	—	—	—
874	4	—	—	1,546	—	—	—
881	2	1	1	—	—	—	1,562
907	4	—	—	1,602	—	—	—
911	4	—	—	1,609	—	—	—
918	4	—	—	1,622	—	—	—
949	4	—	—	**1,672**	—	—	—
972	2	—	2	1,724	—	—	—
979	3	—	1	—	—	—	1,746
1,000	4	—	—	1,790	—	—	—
1,013	3	1	—	1,823	—	—	—
1 017	4	—	—	1,827	—	—	—
1,028	4	—	—	1,841	—	—	—
1,035	2	1	1	1,850	—	—	—
1,044	4	—	—	1,862	—	—	—
1,053	4	—	—	1,881	—	—	—
1,055	4	—	—	1,885	—	—	—
1,059	4	—	—	1,890	—	—	—
1,070	4	—	—	1,914	—	—	—
1,083	4	—	—	1,934	—	—	—
15	1	1	2	—	—	—	19, 53
61	3	—	1	97	—	—	104
66	2	2	—	99, 170	—	—	—
82	2	—	2	—	—	—	121, 232
104	4	—	—	**150, 317**	—	—	—
215	3	—	1	315, 619	—	—	—
257	2	2	—	385, 1,455	—	—	—
260	4	—	—	**768**	389	—	—
296	4	—	—	449, 804	—	—	—
370	2	1	1	581	—	—	**914**
426	3	—	1	**742**	—	—	1,240
433	4	—	—	756, 961	—	—	—
441	2	2	—	770, 1,376	—	—	—
526	4*	—	—	939, 944	—	—	—
533	4	—	—	**947, 1,471**	—	—	—
552	2	—	2	—	—	—	984, **1,476**
415	3	1	—	1,008, 1,364	—	—	—
646	4	—	—	1,140, 1,192	—	—	—
674	2	—	2	—	—	—	1,182, 1,560
684	4	—	—	1,201, 1,478	—	—	—
715	2	—	2	1,277, 1,878	—	—	**1,244, 1,250**
732	4	—	—	—	—	—	—
760	2	—	2	—	—	—	**1,337, 1,365**
812	3	—	1	**1,411**	—	—	**1,561**
875	3	—	1	1,708	—	—	**1,547**

House.	All Inmates.			Attacked with Small-Pox.			
	Vaccinated.	Vaccinated at and after Invasion.	Unvaccinated.	Vaccinated.	Alleged Vaccination.	Under Vaccination.	Unvaccinated.
Houses with Four Inmates. (**142**)—continued.							
927	3	1	—	1,638, 1,798	—	—	—
973	2	2	—	1,727, 1,902	—	—	—
977	2	1	1	1,738	—	—	1,817
83	2	1	1	216	—	217	122
112	2	1	1	160, 210	—	—	196
225	2	1	1	338, 707	—	—	706
235	3	—	1	637, 638	—	—	357
362	3	—	1	964, 1,342	—	—	568
412	4	—	—	682, 688, 1,069	—	—	—
443	2	—	2	773	—	—	1,260, 1,261
451	2	1	1	1,098	—	1,825	785
548	2	—	2	1,428	—	—	1,292, 1,468
612	2	—	2	1,073	—	—	1,522, 1,523
721	3	—	1	1,258, 1,430	—	—	1,489
752	3	1	—	1,551, 1,650	—	1,314	—
857	3	—	1	1,559, 1,717	—	—	1,496
944	3	—	1	1,360, 1,662	—	—	1,768
47	2	—	2	78, 127	—	—	102, 108
192	3	—	1	285, 1,126, 1,539	—	—	1,525
299	1	—	3	451	—	—	455, 456, 457
Houses with Five Inmates. (**156**.)							
3	5	—	—	3	—	—	—
92	5	—	—	136	—	—	—
95	2	—	3	—	—	—	138
100	3	—	2	—	—	—	146
114	2	2	1	—	—	—	161
134	3*	1	1*	187	—	—	—
139	2	2	1	—	—	—	192
141	2	—	3	—	—	—	197
169	3	1	1	—	—	—	233
190	5	—	—	281	—	—	—
212	5	—	—	311	—	—	—
224	5	—	—	337	—	—	—
230	4	—	1*	347	—	—	—
234	5	—	—	356	—	—	—
238	3	2	—	360	—	—	—
247	5	—	—	371	—	—	—
255	4	1	—	381	—	—	—
277	2	3	—	416	—	—	—
311	4	1	—	474	—	—	—
331	2	2	1	—	—	—	506
335	4	—	1	—	—	—	516
347	4	1	—	—	544	—	—
374	1	3	1	—	—	—	592
380	4	—	1	—	—	—	601
382	4	—	1	—	—	—	604
387	5	—	—	614	—	—	—
424	5	—	—	739	—	—	—
440	4	—	1*	769	—	—	—
449	2	2	1	—	—	—	783
461	3	2	—	809	—	—	—
509	4	1	—	921	—	—	—
512	5	—	—	924	—	—	—
515	5	—	—	927	—	—	—
521	5	—	—	934	—	—	—
556	2*	3	—	989	—	—	—
562	5*	—	—	—	1,001*	—	—
615	5	—	—	1,081	—	—	—
619	5	—	—	—	1,084	—	—
624	4	1	—	1,091	—	—	—
629	5	—	—	1,100	—	—	—
638	5	—	—	—	1,125	—	—
650	1	3	1	—	—	—	1,149
656	3	1	1	—	—	—	1,156
668	5	—	—	1,172	—	—	—
670	4	1	—	1,177	—	—	—
700	4	—	1	—	—	—	1,219
705	3*	2	—	1,230	—	—	—

House.	All Inmates.			Attacked with Small-Pox.			
	Vacci-nated.	Vaccinated at and after Invasion.	Unvacci-nated.	Vaccinated.	Alleged Vaccina-tion.	Under Vaccination.	Unvaccinated.
Houses with Five Inmates. (156)—continued.							
710	5	—	—	1,238	—	—	—
717	5	—	—	1,248	—	—	—
731	2	2	1	—	—	—	1,276
737	2	3	—	1,282	—	—	—
742	3	2	—	1,296	—	—	—
747	3	1	1	—	—	—	1,304
748	5	—	—	1,307	—	—	—
750	4	—	1	1,311	—	—	—
756	5	—	—	1,319	—	—	—
704	5	—	—	1,320	—	—	—
757	2	3	—	1,321	—	—	—
764	3	2	—	—	—	1,338	—
765	4	1	—	1,339	—	—	—
774	4	—	1	—	—	—	1,350
797	5	—	—	1,387	—	—	—
798	4	1	—	1,388	—	—	—
800	5	—	—	1,391	—	—	—
806	3	2	—	—	1,402	—	—
836	5	—	—	1,459	—	—	—
839	3	2	—	1,462	—	—	—
846	4*	1	—	1,480	—	—	—
853	2	3	—	1,490	—	—	—
869	2	3	—	—	—	1,536	—
880	2	1	2	—	—	—	1,558
920	2	3	—	1,625	—	—	—
930	5	—	—	1,642	—	—	—
943	4	—	1	—	—	—	1,659
946	2	3	—	1,664	—	—	—
953	3	2	—	1,679	—	—	—
954	4	—	1	1,680	—	—	—
959	5	—	—	1,691	—	—	—
961	5	—	—	1,696	—	—	—
976	1	3	1	—	—	—	1,734
988	3	2	—	1,759	—	—	—
989	4	—	1	—	—	—	1,761
1,003	5	—	—	1,799	—	—	—
1,041	4	1	—	1,856	—	—	—
1,048	2	2	1	1,866	—	—	—
1,063	5	—	—	1,894	—	—	—
1,076	2*	—	3	—	—	—	1,926
1,097	5	—	—	1,960	—	—	—
16	2	—	3	20	—	—	44
40	4	1	—	59, 77	—	—	—
77	2	2	1	238	—	—	116
147	3	—	2	—	—	—	202, 430
186	1	—	4	633	—	—	276
209	4	—	1	307	—	—	306
213	2	2	1	312	—	—	428
216	3	—	2	—	—	—	316, 648
229	5	—	—	345, 699	—	—	—
232	3	—	2	349	—	—	607
241	3	2	—	363	—	1,656	—
242	2	2	1	662	—	—	366
248	2	2	1	372	—	—	780
249	3	2	—	373, 1,929	—	—	—
268	5	—	—	399, 402	—	—	—
274	5	—	—	410, 754	—	—	—
285	5	—	—	433, 915	—	—	—
393	5	—	—	626, 1,958	—	—	—
462	5*	—	—	810, 1,004	—	—	—
472	2	—	3	—	—	—	838, 839
547	4	1	—	978, 1,310	—	—	—
574	5	—	—	1,027, 1,541	—	—	—
587	2	2	1	1,733	—	—	1,042
599	4	—	1	1,957	—	—	1,056
611	5	—	—	1,071, 1,072	—	—	—
630	1	—	4	1,112	—	—	1,530
641	5	—	—	1,133, 1,134	—	—	—
671	4	—	1	1,533	—	—	1,179
744	4	—	1	1,601	—	—	1,300

House.	All Inmates.			Attacked with Small-Pox.			
	Vaccinated.	Vaccinated at and after Invasion.	Unvaccinated.	Vaccinated.	Alleged Vaccination.	Under Vaccination.	Unvaccinated.
Houses with Five Inmates. (156)—continued.							
790	2	3	—	1,621	—	1,375	—
828	5	—	—	1,444, 1,709	—	—	—
868	3	—	2	—	—	—	1,535, 1,740
877	5	—	—	1,550, 1,748	—	—	—
916	3	—	2	1,783	—	—	1,619
955	5	—	—	1,687, 1,810	—	—	—
1,042	5	—	—	1,859, 1,925	—	—	—
54	4	—	1	140, 141	—	—	87
65	4	—	1	175, 386	—	—	98
89	3	—	2	247	—	—	131, 133
108	2	2	1	283, 1,956	—	—	155
148	4	—	1	203, 481	—	—	971
149	3	1	1	422, 423	—	—	204
218	5	—	—	326, 579, 580	—	—	—
293	4	—	1	444, 728	—	—	731
342	4	—	1	842, 1,369	—	—	529
357	3*	1	1	560, 1,540	—	—	883
371	4	1	—	677, 733, 1,249	—	—	—
410	4	—	1	1,145, 1,266	—	—	684
527	2	2	1	940	—	1,587	1,223
537	2	—	2	956	—	—	957, 1,323
608	3	1	1	1,067	—	1,254	1,097
690	3	—	1	1,207, 1,695	—	—	1,821
767	2	—	3	1,341	1,661	—	1,735
842	4	—	1	1,470, 1,725, 1,741	—	—	—
937	3	—	2	1,652	—	—	1,871, 1,938
69	2	—	3	143	—	—	105, 106, 115
117	3	—	2	582	243	—	164, 583
239	4*	—	1	361, 725, 727	—	—	802
252	3	—	2	605, 708	—	—	376, 697
266	2*	—	3	716	—	—	396, 718, 719
281	3	—	2	420, 674	—	—	734, 799
337	1	3	1	—	—	868, 871, 1,089	518
862	2	2	1	1,508, 1,712	—	1,586	1,730
189	2	—	3	513	512	—	280, 511, 515
307	3	—	2	469, 852, 913	—	—	751, 1,002
395	1	—	4	660	—	—	630, 655, 657, 659
401	3	—	2	653, 678, 723	—	—	722, 724
502	1	—	4	1,109	—	—	909, 982, 1,108 1,401
Houses with Six Inmates. (118.)							
25	4	2	—	33	—	—	—
33	5	—	1*	—	—	—	49*
45	5	1	—	74	—	—	—
50	5*	—	1*	82	—	—	—
68	3	3	—	103	—	—	—
70	2	3	1	—	—	—	107
84	2	—	4	—	—	—	123
85	4	1	1	—	—	—	124
86	4	—	2	—	—	—	125
91	2	3	1	—	—	—	134
103	3	—	3	149	—	—	—
137	3	2	1	—	—	—	190
173	3	2	1	—	—	—	248
175	2	3	1	—	—	—	250
179	4	2	—	254	—	—	—
191	4	2	—	282	—	—	—
231	6	—	—	348	—	—	—
278	4	1	1	—	—	—	417
314	2	3	1	—	—	—	482
350	5	—	1	548	—	—	—
363	6	—	—	569	—	—	—
416	3	2	1	—	—	—	702
422	5	1	—	730	—	—	—
490	4	1	1	—	—	—	875
492	5	—	1	—	—	—	878
495	5	—	1	—	—	—	886

House.	All Inmates.			Attacked with Small-Pox.			
	Vaccinated.	Vaccinated at and after Invasion.	Unvaccinated.	Vaccinated.	Alleged Vaccination.	Under Vaccination.	Unvaccinated.
Houses with Six Inmates. (118)—continued.							
501	3	2	1	—	—	—	890
517	2	—	4	929	—	—	—
525	3*	2	1	—	—	—	938
545	6	—	—	976	—	—	—
550	6	—	—	981	—	—	—
551	3	2	1	—	—	—	983
559	6	—	—	995	—	—	—
588	5	—	1	1,043	—	—	—
595	2	2	2	—	—	—	1,051
618	3	2	1	1,083	—	—	—
625	3*	—	3*	1,092	—	—	—
631	5	1	—	1,113	—	—	—
651	5	1	—	1,150	—	—	—
658	6	—	—	—	1,158	—	—
661	5	1	—	1,163	—	—	—
680	2	3	1	—	—	1,196	—
691	2	3	1	1,208	—	—	—
733	2	4	—	1,278	—	—	—
738	6	—	—	1,284	—	—	—
754	6	—	—	1,317	—	—	—
758	6	—	—	1,323	—	—	—
769	6	—	—	1,345	—	—	—
771	5	1	—	1,347	—	—	—
781	3	2	1	—	—	—	1,359
803	6	—	—	1,396	—	—	—
847	5	1	—	1,481	—	—	—
864	4	—	2	1,526	—	—	—
883	2	4	—	1,564	—	—	—
890	4	2	—	1,572	—	—	—
931	5	—	1	1,643	—	—	—
941	3	2	1	—	—	—	1,657
966	6	—	—	1,715	—	—	—
990	3*	2	1	—	—	—	1,763
1,061	6	—	—	1,892	—	—	—
1,066	5*	—	1	—	—	—	1,900
1,078	6	—	—	1,962	—	—	—
1,093	6	—	—	1,952	—	—	—
17	5*	—	1	21, 28	—	—	—
81	1	—	5*	—	—	—	120, 1,845
132	2	—	4	—	—	—	185, 318
163	2	2	2	—	—	—	221, 222
172	6	—	—	244, 472	—	—	—
203	2	4	—	298	—	695	—
253	2	3	1	377	—	—	670
271	3	2	1	686	—	—	407
364	6	—	—	572, 1,765	—	—	—
428	6	—	—	745, 1,472	—	—	—
450	4	2	—	784, 1,358	—	—	—
455	4	—	2	—	—	—	795, 798
476	4	1	1	1,032	—	—	846
513	4	1	1	—	—	1,386	925
561	2	3	1	—	—	1,000	999
586	4	1	1	1,041	—	1,399	—
673	5	—	1	1,499	—	—	1,181
704	3	2	1	1,288, 1,812	—	—	—
720	5	1	—	1,357, 1,425	—	—	—
745	3	2	1	1,302	—	—	1,579
768	6	—	—	1,343, 1,344	—	—	—
786	3	—	3	—	—	—	1,366, 1,632
795	3	2	1	1,383	—	—	1,384
808	2	3	1	1,655	—	—	1,404
887	5	1	—	1,569, 1,628	—	—	—
934	3	2	1	1,785	—	—	1,646
971	3	—	3	—	—	—	1,723, 1,840
987	4	—	2	—	—	—	1,758, 1,867
999	5	—	1	1,876	—	—	1,789
29	4	1	1	41, 61	—	—	42
31	2	—	4	—	—	—	46, 47, 51
106	4	—	2	274	—	—	153, 284
119	2	2	2	286, 584	—	—	166

House.	All Inmates.			Attacked with Small-Pox.			
	Vaccinated.	Vaccinated at and after Invasion.	Unvaccinated.	Vaccinated.	Alleged Vaccination.	Under Vaccination.	Unvaccinated.
			Houses with Six Inmates. (118)—continued.				
275	3	1	2	—	—	793	411, 543
304	4	—	2	465, 710	—	—	654
429	4*	—	2	1,146	—	—	746, 1,282
510	4	1	1	922	—	1,780	1,566
538	4	2	—	967, 968, 1,301	—	—	—
557	2	3	1	1,371	—	1,330	990
570	6*	—	—	1,022, 1,447, 1,448	—	—	—
672	1	3*	2	1,580	—	—	1,180, 1,654
719	4	1	1	1,256	1,227	—	1,298
963	5	—	1	1,703, 1,873	—	—	1,812
405	4	1	1	1,110, 1,117, 1,326	—	—	668
466	4	—	2	1,271, 1,581	—	—	814. 1,582
499	2	—	4	1,023	—	—	899, 959, 960
584	6	—	—	1,038, 1,039, 1,469, 1,710	—	—	—
904	2	—	4	—	—	—	1,598, 1,782, 1,857, 1,858
21	2	—	4	39	—	—	25, 34, 35, 36
265	3	1	2	720, 822	—	823	395, 717
301	4	—	2	738, 776, 796	—	—	459, 777
338	4	1	1	520, 835, 1,368	—	1,367	1,498
170	1	—	5	464	—	—	237, 462, 463, 721, 758
316	3	1	2	649, 650, 830	—	829	484, 642
432	2	—	4	755, 1,101	—	—	1,102, 1,103, 1,104 1,105
			Houses with Seven Inmates. (105.)				
26	5	—	2	37	—	—	—
72	7	—	—	110	—	—	—
75	2	—	5	—	—	—	113
144	5	—	2	—	—	—	198
157	6	1	—	213	—	—	—
174	3	3	1	—	—	—	249
178	5	2	—	253	—	—	—
198	3	3	1	—	—	—	293
210	4*	2	1	—	—	—	308
273	3	4	—	409	—	—	—
319	6*	—	1	—	—	—	487
329	5	2	—	504	—	—	—
345	5	—	2	—	—	—	533
352	7	—	—	551	—	—	—
385	7	—	—	615	—	—	—
431	4	3	—	—	—	753	—
456	3	3	1	—	—	—	801
458	7	—	—	806	—	—	—
503	4	3	—	910	—	—	—
504	2	4	1	—	—	—	908
516	3	3	1	928	—	—	—
534	2	4	1*	948	—	—	—
540	5	—	2	—	969	—	—
912	5	2	—	771	—	—	—
582	7	—	—	1,036	—	—	—
590	7	—	—	1,045	—	—	—
620	7	—	—	1,085	—	—	—
623	6*	1	—	1,090	—	—	—
636	4	2	1	—	—	—	1,122
688	4*	3	—	1,205	—	—	—
709	6	—	1	—	—	—	1,237
763	2	5	—	—	—	1,337	—
796	5	2	—	1,385	—	—	—
802	4	3	—	1,395	—	—	—
840	6	1	—	—	—	1,465	—
841	4	3	—	1,467	—	—	—
888	3*	3	1	—	—	—	1,570
900	4	3	—	—	—	1,585	—
906	6	—	1	—	—	—	1,600
910	4	2	1	1,608	—	—	—
922	7*	—	—	1,629	—	—	—
967	4*	3	—	1,716	—	—	—

House.	All Inmates.			Attacked with Small-Pox.			
	Vaccinated.	Vaccinated at and after Invasion.	Unvaccinated.	Vaccinated.	Alleged Vaccination.	Under Vaccination.	Unvaccinated.
Houses with Seven Inmates. **(105)**—continued.							
1,014	7	—	—	1,824	—	—	—
1,034	7	—	—	1,849	—	—	—
1,052	7	—	—	1,880	—	—	—
1,089	7	—	—	1,944	—	—	—
1,098	4	2	1	—	—	—	1,961
39	4**	1	2	—	—	—	58, 75
78	3	—	4	—	—	—	117, 224
120	4	—	3	278	—	—	167
295	7	—	—	447, 1,233	—	—	—
403	2	3	2	—	—	—	663, 664
468	7	—	—	821, 1,436	—	—	—
473	1	—	6	—	—	—	841, 905
506	3	—	4	1,439	907	—	—
518	4	—	3	—	—	—	930, 1,291
535	1	5	1	—	—	1,426	949
567	2	2	3	1,018	—	—	1,019
569	4	1	2	1,713	—	—	1,021
580	6	1	—	1,034, 1,086	—	—	—
616	7*	—	—	1,096, 1,649	—	—	—
667	7*	—	—	1,306	1,170	—	—
725	4*	3	—	1,265	—	1,611	—
794	4*	3	—	1,382	—	1,423	—
908	5	2	—	1,603, 1,721	—	—	—
938	2	3	2	—	—	—	1,653, 1,781
950	6	1	—	1,673, 1,801	—	—	—
118	4	—	3	—	414	—	165, 415
165	4	—	3	—	—	—	225, 226, 528
181	4	1	2	—	—	553	269, 1,169
322	5	1	1	490	—	321	744
376	4	2	1	595, 911	—	—	596
427	4	2	1	1,194, 1,294	—	—	743
566	4	—	3	1,491	—	—	1,016, 1,409
652	6	1	—	1,152, 1,263, 1,660	—	—	—
814	2	5	—	1,903	—	1,414, 1,743	—
817	2	4	1	1,520	—	1,521	1,418
1,049	7	—	—	1,869, 1,882, 1883	—	—	—
34	3	1	3	—	—	70	57, 68, 69
58	2	—	5	91, 322	—	—	180, 184
107	3	3	1	154, 1,584	—	1,739	1,555
116	5	—	2	576, 737	—	—	163, 575
161	3	1	3	—	—	698	219, 953, 954
220	4	2	1	332, 898	—	1,195	1,013
294	6	—	1	714, 759, 1,251	—	—	445
297	2	3	2	752	—	916	450, 955
417	4	—	3	1,138	—	—	704, 1,003, 1,372
425	5	1	1	1,178, 1,235, 1,332	—	—	740
519	3	—	4	—	—	—	931, 1,393, 1,394 1,432
850	5	1	1	1,953, 1,971, 1,978	—	—	1,485
865	5	—	2	1,714, 1,736	1,527	—	1,528
143	4	—	3	378, 1,121	—	—	195, 380, 382
280	7	—	—	419, 652, 661, 749, 750	—	—	—
324	3	—	4	893	—	—	495, 892, 894, 1,123
332	2	—	5	—	—	—	507, 760, 900, 901, 902
397	4	—	3	641, 832	—	—	640, 736, 833
420	4	2	1	1,053, 1,524	1,151	1,159	712
434	5	—	2	757, 1,143, 1,144	—	—	1,287, 1,288
632	2	2	3	—	—	1,446, 1,501	1,114, 1,222, 1,500
924	4	—	3	1,631, 1,634	—	—	1,786, 1,787, 1,788
246	7	—	—	369, 600, 628, 629, 631, 741	—	—	—
389	5	1	1	616, 867, 964, 965	—	963	618
391	3	3	1	622, 951	—	952, 1,009, 1,010	623
136	2	—	5	325, 400	—	—	189, 323, 324, 327, 401
244	2	—	5	530, 701	—	—	368, 524, 525, 526, 527

House.	All Inmates.			Attacked with Small-Pox.			
	Vacci-nated.	Vaccinated at and after Invasion.	Unvacci-nated.	Vaccinated.	Alleged Vaccina-tion.	Under Vaccination.	Unvaccinated.
			Houses with Eight Inmates. (73.)				
12	8*	—	—	15	—	—	—
88	7	—	1	—	—	—	130
111	3	2	3	—	—	—	158
127	5	—	3	—	—	—	178
160	5	—	3	—	—	—	218
199	8	—	—	294	—	—	—
202	7	1	—	297	—	—	—
258	4*	4	—	387	—	—	—
353	8	—	—	552	—	—	—
373	8	—	—	593	—	—	—
392	6	1	1	—	—	—	625
435	7	1	—	761	—	—	—
484	6	1	1	—	—	—	865
511	6	—	2	—	—	—	923
592	4	4	—	1,047	—	—	—
593	8*	—	—	1,048	—	—	—
598	7	—	1	1,055	—	—	—
606	6	—	2	—	—	—	1,063
627	7*	1	—	1,095	—	—	—
635	4	—	4	1,120	—	—	—
675	4	3	1	—	—	1,183	—
708	5	3	—	1,236	—	—	—
829	4	2	2	—	—	—	1,445
852	8	—	—	1,487	—	—	—
942	8	—	—	1,658	—	—	—
956	7*	1	—	—	—	1,688	—
1,001	5	2	1	1,791	—	—	—
1,019	4	4	—	1,829	—	—	—
1,067	2	5	1	—	—	—	1,901
30	5	—	3	45	—	—	71
32	6	—	2	—	—	—	48, 50
90	6	—	2	267	—	—	132
97	6	—	2	—	—	—	142, 341
138	3	4	1	390	—	—	191
256	3	4	1	398	—	—	383
269	4	4	—	404, 667	—	—	—
366	4	3	1	958	—	—	574
723	5	—	3	—	—	—	1,262, 1,466
854	3	3	2	—	—	—	1,493, 1,509
947	5	2	1	1,793	—	—	1,666
952	8	—	—	1,677, 1,787	—	—	—
969	6	2	—	1,839	—	1,719	—
1,023	7	—	1	1,922	—	—	1,835
41	7	—	1	60, 84, 1,977	—	—	—
150	5	—	3	—	—	—	205, 478, 514
159	5	—	3	499	—	—	215, 498
221	2	6	—	333, 861	—	860	—
577	7	—	1	1,477, 1,651	—	—	1,030
585	7	1	—	1,040, 1,435	—	1,702	—
992	4	2	2	1,910	—	—	1,767, 1,868
996	7	—	1	1,776, 1,796	—	—	1,808
1,025	7	—	1*	1,837, 1,916, 1,963	—	—	—
99	6	—	2	246, 351	—	—	145, 245
101	3	3	2	—	—	262, 263	147, 261
318	2	3	3	848, 850	—	851	486
369	4	—	4	578, 882, 1,079	—	—	1,080
722	6	—	2	1,259, 1,552	—	—	1,553, 1,705
895	4	—	4	—	—	—	1,583, 1,613, 1,683, 1,742
964	4	1	3	1,877	—	—	1,706, 1,811, 1,812
67	4	—	4	100	—	—	352, 353, 405, 656
122	5	1	2	169, 556, 557	—	—	273, 555
146	5	1	2	319, 437	—	673	200, 355
358	3	4	1	906	—	815, 837, 884	562
407	5	—	3	679, 1,315	—	—	794, 826, 1,269
805	4	3	1	1,605, 1,769	—	1,636, 1,685	1,398
64	4	—	4	494, 501	—	—	96, 492, 493, 1,094
289	3	—	5	896	—	—	438, 891, 895, 897, 920
356	4	—	4	588, 621	—	—	559, 561, 563, 819

House.	All Inmates.			Attacked with Small-Pox.			
	Vaccinated.	Vaccinated at and after Invasion.	Unvaccinated.	Vaccinated.	Alleged Vaccination.	Under Vaccination.	Unvaccinated.
Houses with Eight Inmates. (73)--continued.							
444	6	1	1	536, 840, 917, 1,226, 1,227	—	774	—
464	3	2	3	1,289	—	1,176, 1,290	812, 843, 1,175
565	8	—	—	1,011; 1,012, 1,017, 1,106, 1,107, 1,762	—	—	—
1,046	3	—	5	—	1,864	—	1,899, 1,928, 1,935, 1,937, 1,940
498	4	—	4	388, 889, 1,421	—	—	1,518, 1,751, 1,752, 1,678
Houses with Nine Inmates. (49.)							
27	5*	—	4	—	—	—	38
71	7	—	2	—	—	—	109
162	3	4	2*	—	—	—	220
176	7	2	—	251	—	—	—
310	6	3	—	473	—	—	—
402	9*	—	—	658	—	—	—
483	7	2	—	—	—	864	—
553	6	2	1	—	—	—	985
603	5	—	4	1,060	—	—	—
610	4	5	—	1,070	—	—	—
637	6	3	—	1,124	—	—	—
682	9	—	—	1,199	—	—	—
743	6	3	—	1,299	—	—	—
755	8	1	—	1,318	—	—	—
791	7	2	—	1,378	—	—	—
811	9	—	—	—	1,410	—	—
879	4	5	—	—	1,557	—	—
882	9	—	—	1,563	—	—	—
993	9	—	—	1,771	—	—	—
35	8	—	1	52	—	—	79
105	5	2	2	—	—	—	151, 152
110	8	—	1	303	—	—	157
156	5	3	1	403	—	—	212
168	5	—	4	446	—	—	229
184	5	3	1	272	—	—	448
479	9	—	—	853, 1,273	—	—	—
687	7	2	—	1,204, 1,538	—	—	—
76	8	—	1	231, 239	—	—	114
447	5	—	4	779, 1,846, 1,919	—	—	—
485	3*	—	6*	1,115	—	—	870, 1,116
572	6	2	1	1,025, 1,453	—	—	1,454
634	7*	—	2	1,119, 1,889	—	—	1,589
692	7	—	2	1,209, 1,420	—	—	1,210
728	7**	—	2**	1,272, 1,437, 1,681	—	—	—
649	5*	4	—	1,400, 1,639, 1,775	—	—	—
1,005	6	—	3	—	—	—	817, 1,374, 1,606
142	6	—	3	340, 354, 791	—	—	194
313	4	2	3	1,519	—	—	477, 676, 1,193
761	6	1	2	1,335	—	1,494	1,333, 1,334
96	5	—	4*	567, 991	—	—	139, 230, 993
123	5	—	4	873, 874	—	—	171, 440, 747
276	9	—	—	412, 671, 1,127, 1,253, 1,607	—	—	—
452	6	—	3	789, 831	—	—	787, 790, 792
739	6**	—	3	1,434, 1,506	—	—	979, 1,286, 1,507
965	5	—	4	1,803	—	—	1,711, 1,804, 1,805, 1,807
151	4	—	5	310, 339	—	—	206, 335, 424, 425, 426
409	5	—	4	692, 1,111, 1,185	—	—	683, 1,184, 1,270, 1,331
251	6	—	3	375, 818, 824. 862, 1,246	—	—	1,189, 1,190, 1,329
1,064	4	—	5	1,907, 1,908, 1,909	—	—	1,895, 1,897, 1,898, 1,906, 1,912

House.	All Inmates.			Attacked with Small-Pox.			
	Vaccinated.	Vaccinated at and after Invasion.	Unvaccinated.	Vaccinated.	Alleged Vaccination.	Under Vaccination.	Unvaccinated.
				Houses with Ten Inmates. (25.)			
43	6	—	4	72	—	—	—
63	7	2	1	—	—	—	95
188	10	—	—	279	—	—	—
388	7	—	3	615	—	—	—
505	7	2	1	—	—	—	912
751	7	2	1	1,313	—	—	—
785	8	2	—	1,363	—	—	—
995	9	—	1	1,774	—	—	—
741	6	4	—	1,295, 1,588	—	—	—
753	8*	2	—	1,316	1,475	—	—
856	4	5	1	1,655	—	—	1,497
863	5	2	3	—	—	—	1,510, 1,548
970	9	—	1	1,720	—	—	**1,773**
109	7*	—	3	—	—	—	**156, 255, 256**
171	5	3	2	480	—	—	240, 856
341	9	—	1	523, 1,078	—	—	1,014
8	8	—	2	9, 12	—	—	**8, 10**
195	2	5	3	—	—	624, 665	289, 534, 666
932	8	—	2	1,644, 1,779, 1,806	—	—	1,674, 1,745
113	6	—	4	**291**, 644	—	—	**159**, 466, 479, **643**
1,021	6	2	2	1,947, 1,948	—	**1,831, 1,832**	1,833, 1,946
400	7	1	2	651, 1,174, 1,285, 1,517	—	1,173	1,515, 1,516
56	3	—	7	330	—	—	89, 173, **101**, 1,416 1,670, **1,671**, 1,704
140	4	—	6	365, 384	—	—	**193**, 364, 413, 693, 694, 1,161
194	5	—	5	540, 541, 542, 585	--	—	**288, 537, 538, 539, 669**
				Houses with Eleven Inmates. (11.)			
204	10	1	—	299	—	—	—
321	6	3	2	—	—	—	489
413	8	3	—	691	—	—	—
602	7*	2	2	—	—	—	**1,059**
1,016	10	—	1	1,826	—	—	—
712	7	4	—	1,241, 1,379	—	—	—
823	6	5	—	1,692	—	1,431	—
1,038	11	—	—	1,853, 1,861	—	—	—
152	7	—	4	421, 439	—	—	207
633	7	2	2	1,118, 1,610	—	—	**509, 1,224**
94	7	—	4	235, 259, 260, 265, 236, 266, 268	—	—	**135, 234, 314, 429**
				Houses with Twelve Inmates. (7.)			
411	7	—	5	—	—	—	685, **689**
87	7	—	5	1,128	—	—	128, 129, 647
303	8	—	4	—	—	—	461, **880, 881**, 932
182	8	—	4	270, 571	—	—	580, 700, **715, 828**
560	7	—	5	1,075	998	—	**1,015, 1,076**, 1,171, 1,513, **1,514**
678	5	1	6	1,512, 1,701, 1,913	—	—	**1,188, 1,492**, 1,511, 1,698, **1,699, 1,700**
272	8	2	2	**408**, 586, 609, 632, 687, 709, 726	587	635, 636	**590, 610**
				Houses with Thirteen Inmates. (3.)			
282	5	8	—	427	—	—	—
145	8	5	—	199	—	**201**	—
125	6	3	4	—	—	827	**174, 820**, 1,142, 1,247

The analysis of this table shows the following to be the incidence and fatality of small-pox in households of various sizes :—

No. of Inmates.	"Vaccinated" Class.			Attack Rate.	Fatality.	"Unvaccinated" Class.			Attack Rate.	Fatality.
	Exposed.	Attacked.	Died.			Exposed.	Attacked.	Died.		
				Per Cent.	Per Cent.				Per Cent.	Per Cent.
One - -	2	2	—	100·0	—	—	—	—	—	—
Two - -	147	93	11	63·2	11·8	3	2	—	66·6	—
Three - -	334	144	10	43·1	6·9	65	34	14	52·3	41·1
Four - -	433	152	21	35·1	13·8	135	55	16	40·7	29·1
Five - -	548	170	13	31·0	7·6	232	104	45	44·8	43·2
Six - -	455	114	7	25·0	6·1	253	107	45	42·2	42·0
Seven - -	463	121	17	26·1	14·0	272	128	48	47·0	37·5
Eight - -	383	87	5	22·7	5·7	201	104	44	51·7	42·3
Nine - -	303	73	9	24·0	12·3	138	61	21	44·2	34·4
Ten - -	163	35	1	21·4	2·8	87	50	16	57·4	32·0
Eleven - -	86	19	—	22·0	—	35	10	8	28·5	80·0
Twelve - -	50	16	1	32·0	6·2	34	28	14	82·3	50·0
Thirteen -	19	2	—	10·5	—	20	6	4	30·0	66·6
	3,386	1,028	95	30·3	9·2	1,475	689	275	46·9	40·0

It may be of interest to give similar particulars of those members of the "unvaccinated class" who were vaccinated either just before or during the invasion of their homes by small-pox. As already stated, these number 653, of whom 85 were attacked by small-pox. They are thus distributed :—

No. of Inmates.	Exposed.	Attacked.	Died.	Attack Rate.	Fatality.
				Per Cent.	Per Cent.
Three - -	21	6	3	28.5	50·0
Four - -	63	5	—	8·0	—
Five - -	110	10	4	9·0	40·0
Six - - -	119	11	3	9·2	27·2
Seven - -	133	24	5	18·0	20·8
Eight - -	85	17	7	20·0	41·1
Nine - -	51	2	—	3·9	—
Ten - - -	32	5	2	15·6	40·0
Eleven - -	20	1	—	5·0	—
Twelve - -	3	2	—	66·6	—
Thirteen -	16	2	1	12·5	50·0
	653	85	25	13·0	29·4

It remains to determine the relative extent to which the incidence of small-pox on the "vaccinated" and "unvaccinated" respectively occurred at different age periods. It will be seen that both amongst the "exposed" and the "attacked," the unvaccinated group preponderates amongst the children, the vaccinated amongst adults.

"*Vaccinated*" *Class.*

Age.	Exposed.	Attacked.	Died.	Attack Rate.	Fatality.
				Per Cent.	Per Cent.
1 month and under - -	—	—	—	—	—
1 month to 1 year - -	14	—	—	—	—
1 to 10 years - - -	258	24	1	9·3	4·1
10 to 30 years - -	1,649	539	30	32·6	5·5
30 years and over - - -	1,465	465	64	31·7	13·7
	3,386	1,028	95	30·3	9·2

"*Unvaccinated*" *Class.*

Age.	Exposed.	Attacked.	Died.	Attack Rate.	Fatality.
				Per Cent.	Per Cent.
1 month and under - -	23	20	19	87·0	95·0
1 month to 1 year - -	130	60	37	46·1	61·6
1 to 10 years - - -	1,178	537	192	45·5	35·7
10 to 30 years - -	102	55	18	53·9	32·7
30 years and over - - -	42	17	9	40·5	53·0
	1,475	689	275	46·9	40·0

And again detaching those "under" vaccination:—

Age.	Exposed.	Attacked.	Died.	Attack Rate.	Fatality.
				Per Cent.	Per Cent.
1 month and under - -	1	—	—	—	—
1 month to 1 year - -	56	10	3	17·8	30·0
1 to 10 years - - -	550	66	21	12·0	31·8
10 to 30 years - -	39	8	1	20·5	12·5
30 years and over - -	7	1	—	14·2	—
	653	85	25	13·0	29·4

These results may be further summarised as follows:—

Below the age of 10 *years* there were 1,603 persons in this community of 899 households; 272 of them were vaccinated, 1,331 unvaccinated, or, to every 100, there were 17 vaccinated, 83 unvaccinated. The small-pox attack rate on the whole number was 40 per cent. (641 attacked), and the fatality amongst these 38·8 per cent. Amongst the *vaccinated* members the small-pox attack rate was 8·8 per cent., and the fatality amongst these cases, 4·1 per cent.* Amongst the *unvaccinated* members, the small-pox attack rate was 46·3 per cent., *i.e.*, nearly one-half of those exposed, and their fatality 40·1 per cent.

[These figures are materially increased if those of the "unvaccinated" who were undergoing vaccination at the time of the small-pox invasion be deducted, for this would give unvaccinated:—exposed, 724; attacked, 541; died, 224; *i.e.*, an attack rate of 74·4 per cent. and a fatality of 41·4 per cent.]

Above the age of 10 *years* there were 3,258 persons in this community of 899 households; 3,114 of them had been vaccinated in infancy or childhood, 144 of them were unvaccinated, or to every 100 there were 96 vaccinated to 4 unvaccinated. The small-pox attack rate on the whole number was 33 per cent. (1,076 attacked), and the fatality amongst these 11·2 per cent. Amongst the *vaccinated* members the small-pox attack rate was 32·2 per cent., and the case fatality 9.3 per cent. Amongst the *unvaccinated* members the small-pox attack rate was 50 per cent., and the fatality 37·5 per cent. of those attacked.

[Deducting those "under vaccination" causes an increase in these unvaccinated rates, for it leaves only 98 exposed, 63 attacked, 26 died, or an attack rate of 64·2 per cent,, and fatality of 41·2 per cent.]

Previous Small-Pox.—A certain number of individuals stated that they had previously been attacked with small-pox, and it may be of interest to ascertain to what extent this circumstance affects these rates. This assertion was made in respect to 77 individuals, 4 of whom were attacked in this epidemic. The deduction of these would give—

4,861 — 77 = 4,784 exposed to infection,
1,717 — 4 = 1,713 attacked with small-pox,

which would yield an attack rate of 35·8 instead of 35·3.

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* There was one fatal case, that of a child (No. 1,695) already referred to, who was vaccinated within a month of being attacked with small-pox.

These 77 persons were thus distributed as to age:—

1 to 10 years - - - 2
10 „ 30 „ - - - 9
30 and over - - - 66—4 attacked,

and deducting them from the numbers already given we have:—

Age.	Exposed.	Attacked.	Rate.
			Per Cent.
1 to 10 years - -	1,436 — 2 = 1,434	561	39·1
10 to 30 years -	1,751 — 9 = 1,742	594	34·1
30 and over - -	1,507 — 66 = 1,441	482 — 4 = 478	33·7

Again these 77 individuals comprise 56 who had been vaccinated in infancy, and 21 who had not been vaccinated. Three of the former and one of the latter were attacked. Their deduction would thus affect the rates previously given:—

Age.	Exposed.	Attacked.	Rate.
			Per Cent.
Vaccinated - -	3,386 — 56 = 3,330	1,028 — 3 = 1,025	30·8
Unvaccinated -	1,475 — 21 = 1,454	689 — 1 = 688	47·3

And at age periods:—

Age.	Exposed.	Attacked.	Rate.
Vaccinated:—			Per Cent.
10 to 30 years -	1,649 — 6 = 1,643	539	32·8
30 and over -	1,465 — 50 = 1,415	465 — 3 = 462	32·6
Unvaccinated:—			
1 to 10 years -	1,178 — 2 = 1,176	537	45·6
10 to 30 years -	102 — 3 = 99	55	55·5
30 and over -	42 — 16 = 26	17 — 1 = 16	61·5

It will be observed that the attack rate amongst those who were said to have had small-pox before was 5·2 per cent.

§16.—Hospital Isolation and Vaccination.

It is important, but difficult, to endeavour to determine to what extent hospital isolation limits the spread of an infectious disease. In the present outbreak opportunity has been afforded for contrasting the incidence of small-pox in families amongst those whose members were removed to hospital, and those where they remained in their homes. Four categories may be established, viz.:—

A.—Households from which every case of small-pox was *removed to hospital* when it occurred.

B.—Households in which every case of small-pox that occurred was *retained at home.*

C.—Households from which the *initial case was removed to hospital,* whilst of those arising later some were retained at home, some perhaps removed.

D.—Households in which the *initial case was retained at home,* those arising later being either removed or also remaining.

In series A. there were 361 households.
„ B. „ „ 629 „
„ C. „ „ 64 „
„ D. „ „ 44 „

1,098

Dealing thus with the whole number of houses invaded by small-pox, the first question that arises is whether the removal of cases to hospital in any way influenced the numbers attacked in families. From the subjoined table it will be seen that in every one of the 108 households falling into categories C. and D. there was more than a single case of small-pox, showing that there was no material difference in this respect whether the initial case was removed to hospital or retained at home. It is, however, otherwise where *all* the cases were removed, for in Series A. there were 261 houses yielding single cases, or 72·3 per cent. of all invaded; whereas where *all* cases remained in their homes, as in Series B., there were 405 houses yielding single cases, or 64·3 per cent.

——		Group A.	Group B.	Group C.	Group D.	Total.
Multiple Cases	12	—	1	—	—	1
	11	—	—	1	—	1
	10	—	—	—	—	—
	9	—	—	1	1	2
	8	1	1	1	1	4
	7	—	3	3	1	7
	6	1	7	5	3	16
	5	7	14	9	7	37
	4	8	20	9	7	44
	3	25	50	13	6	94
	2	58	128	22	18	226
Single Cases - -		261	405	—	—	666
		361	629	64	44	1,098

From which it appears that amongst the households yielding multiple cases the proportion of houses having more than three cases was in Series A. 17 per cent., B. 20 per cent., C. 54·7 per cent., D. 54·5 per cent., showing a slight advantage in the cases of those where all the attacked were removed to hospital.

It will be remembered that the proportions of the various classes of vaccinated and non-vaccinated amongst the whole number of attacked were as follows:—

"Vaccinated" class 1,211, or 61·2 per cent.; "unvaccinated" class 768, or 38·8 per cent., the latter being divisible into those "under" vaccination when attacked, 89, or 4·5 per cent., and those who remained unvaccinated throughout, 679, or 34·3 per cent. It is interesting to compare these general results with those obtaining in each of the four series of groups of invaded houses, whose inmates were attacked in the following proportions:—

——	Vaccinated Class.		"Under" Vaccination.		Unvaccinated.	
	Attacked.	Per Cent.	Attacked.	Per Cent.	Attacked.	Per Cent.
Series A. - - - - -	304	57·0	21	4·0	208	39·0
" B. - - - -	708	67·8	46	4·4	290	27·7
" C. - - - -	125	51·4	9	3·7	109	44·8
" D. - - -	74	46·5	13	8·1	72	45·3

From which it would appear, contrasting A. and B. only, that there was a larger proportion of unvaccinated attacks in those households where every case was removed than in those where every case remained at home.

Analysing now the 899 households of whose members particulars were obtained, there is information of 231 in Series A., 567 in Series B., 60 in Series C., and 41 in Series D. It may be convenient to take each of these separately, considering (1) the attack-rate and fatality; (2) the vaccination condition of those exposed to infection, and then contracting small-pox, in respect to the number of inmates in each house.

Series A.

No. of Inmates Per House.	No. of Houses.	Numbers attacked with Small-Pox.								Total.		
		1.	2.	3.	4.	5.	6.	7.	8.	Inmates.	Cases.	Deaths.
1	1	1	—	—	—	—	—	—	—	1	1	—
2	11	10	1	—	—	—	—	—	—	22	12	2
3	23	21	1	1	—	—	—	—	—	69	26	7
4	42	31	6	3	2	—	—	—	—	168	60	8
5	34	23	7	3	—	1	—	—	—	170	51	23
6	41	26	7	5	1	1	1	—	—	246	70	24
7	26	14	7	3	2	—	—	—	—	182	45	22
8	21	9	5	2	3	2	—	—	—	168	47	12
9	22	14	5	2	—	1	—	—	—	198	35	7
10	6	3	1	1	—	—	—	—	1	16	16	3
11	3	2	—	1	—	—	—	—	—	33	5	2
13	1	—	1	—	—	—	—	—	—	13	2	1
	231	154	41	21	8	5	1	—	1	1,330	370	111

The attack rate on the whole number of inhabitants of these 231 houses was therefore 27·8 per cent.; in houses having six inmates or less, 32·5 per cent. (exposed 676, attacked 220); in houses having more than six inmates 22·9 per cent. (exposed 654, attacked 150). The fatality on the whole number was 30 per cent., or 29·1 per cent. in the smaller and 31·3 per cent. in the larger households (which necessarily contain a larger proportion of children).

No. of Inmates Per House.	Exposed to Infection.				Attacked by Small-Pox.			
	"Vaccinated."	"Under" Vaccination.	Unvaccinated.	Total.	"Vaccinated."	"Under" Vaccination.	Unvaccinated.	Total.
1	1	—	—	1	1	—	—	1
2	20	—	2	22	11	—	1	12
3	57	7	5	69	22	1	3	26
4	122	23	23	168	43	2	15	60
5	106	28	36	170	24	2	25	51
6	144	44	58	246	29	1	40	70
7	104	31	47	182	15	4	26	45
8	109	28	31	168	20	6	21	47
9	143	32	25	198	20	—	15	35
10	15	9	16	60	5	—	11	16
11	20	5	8	33	2	—	3	5
13	8	5	—	13	1	1	—	2
	867	212	251	1,330	193	17	160	370

The *attack rate* amongst the inmates of these houses belonging to the "vaccinated" class was therefore 22·2 per cent.; amongst those who were "undergoing" vaccination 8 per cent.; amongst the unvaccinated 63·7 per cent.

The *proportion* of the vaccinated amongst all the inmates was 65·2 per cent.; of those undergoing vaccination 16 per cent.; of unvaccinated 18·9 per cent. The like proportions amongst the attacked were, vaccinated, 52·1 per cent.; "under" vaccination, 4·6 per cent.; unvaccinated, 43·2 per cent.

In houses of six inmates or less the attack rates were, vaccinated, 29 per cent.; undergoing vaccination, 5·8 per cent.; unvaccinated, 67·7 per cent.

In houses of more than six inmates the attack rates were, vaccinated, 15·1 per cent.; undergoing vaccination, 10 per cent.; unvaccinated, 60 per cent.

The proportions amongst the inmates of the smaller households were, vaccinated, 66·5 per cent.; under vaccination, 15·1 per cent.; unvaccinated, 18·3 per cent. Amongst those of the larger households there were, vaccinated, 65·2 per cent.; under vaccination, 16·8 per cent.; unvaccinated, 19·4 per cent.

On the other hand the proportions amongst the attacked were, in the smaller househoulds, vaccinated, 59·1 per cent.; under vaccination, 2·7 per cent.; unvaccinated, 38·2 per cent.; and in the larger households, vaccinated, 42 per cent.; under vaccination, 7·3 per cent.; unvaccinated, 50·7 per cent.

SERIES B.

No. of Inmates Per House.	No. of Houses.	Numbers attacked by Small-Pox.									Total.		
		1.	2.	3.	4.	5.	6.	7.	8.	12.	Inmates.	Cases.	Deaths.
1	1	1	—	—	—	—	—	—	—	—	1	1	—
2	62	45	17	—	—	—	—	—	—	—	124	79	8
3	105	74	25	6	—	—	—	—	—	—	315	142	16
4	86	66	15	8	—	—	—	—	—	—	356	120	26
5	107	65	23	12	6	1	—	—	—	—	535	176	26
6	68	37	18	6	3	3	1	—	—	—	408	124	22
7	59	33	8	5	4	7	1	1	—	—	413	128	26
8	41	20	7	6	3	—	4	1	—	—	328	95	23
9	16	5	1	6	1	1	—	1	1	—	144	49	4
10	6	5	1	1	—	1	1	—	—	—	90	21	2
11	5	3	2	—	—	—	—	—	—	—	55	7	—
12	4	—	1	—	2	—	—	—	—	1	48	22	6
13	1	1	—	—	—	—	—	—	—	—	13	1	—
	567	355	118	50	19	13	7	3	1	1	2,830	965	159

The attack rate on the whole number of inhabitants of these 567 houses was therefore 34·1 per cent.; in houses having six inmates or less, 36·9 per cent. (exposed, 1,739; attacked, 642); in houses having more than six inmates, 29·6 per cent. (exposed, 1,091; attacked, 323). The fatality on the whole number of attacks was 16·4 per cent., or 15·2 per cent. in the smaller, and 18·8 in the larger households.

Number of Inmates per House.	Exposed to Infection.				Attacked by Small-Pox.			
	Vaccinated.	Under Vaccination.	Un-vaccinated.	Total.	Vaccinated.	Under Vaccination.	Un-vaccinated.	Total.
1	1	—	—	1	1	—	—	1
2	123	—	1	124	78	—	1	79
3	265	13	37	315	114	5	23	142
4	280	33	43	356	89	2	29	120
5	397	74	64	535	120	6	50	176
6	280	65	63	408	71	7	46	124
7	274	81	58	413	65	11	52	128
8	229	45	54	328	51	8	36	95
9	102	12	30	144	28	2	19	49
10	73	6	11	90	12	2	7	21
11	45	9	1	55	6	1	—	7
12	30	2	16	48	9	2	11	22
13	5	8	—	13	1	—	—	1
	2,104	348	378	2,830	645	46	274	965

The *proportion* of the vaccinated amongst all the inmates was 74·3 per cent; of those undergoing vaccination at the time of the invasion, 12·3 per cent.; of the unvaccinated, 13·3 per cent. The like proportions amongst those who were attacked were, vaccinated, 66·8 per cent.; under vaccination, 4·7 per cent.; unvaccinated 28·4 per cent.

In houses having six inmates or less the proportions amongst them were, vaccinated, 77·4 per cent.; under vaccination, 10·6 per cent.; unvaccinated, 11·9 per cent.; whilst amongst the attacked the proportions were, vaccinated, 73·6 per cent.; under vaccination, 3·1 per cent.; unvaccinated, 23·2 per cent.

In houses having more than six inmates the proportions amongst them were, vaccinated, 69·4 per cent.; under vaccination, 14·9 per cent.; unvaccinated, 15·6 per cent.; and amongst the attacked, vaccinated, 53·2 per cent.; under vaccination, 8 per cent.; unvaccinated, 38·7 per cent.

The *attack rate* amongst all those of the "vaccinated class" was 30·6 per cent.; of those under vaccination, 13·2 per cent.; of the unvaccinated, 72·4 per cent.

In the smaller households the attack rates were, for the vaccinated, 35·1 per cent.; for those under vaccination, 10·8 per cent.; for the unvaccinated, 71·6 per cent.

In the larger households the attack rates were, vaccinated, 22·6 per cent.; under vaccination, 16·0 per cent.; unvaccinated, 73·5 per cent.

SERIES C.

Number of Inmates per House.	No. of Houses.	Numbers attacked by Small-Pox.									Total		
		2.	3.	4.	5.	6.	7.	8.	9.	11.	Inmates.	Cases.	Deaths.
2	1	1	—	—	—	—	—	—	—	—	2	2	—
3	2	2	—	—	—	—	—	—	—	—	6	4	—
4	5	4	1	—	—	—	—	—	—	—	20	11	2
5	9	5	2	1	1	—	—	—	—	—	45	25	6
6	6	3	2	1	—	—	—	—	—	—	36	16	2
7	12	2	2	5	2	—	1	—	—	—	84	47	9
8	8	2	1	—	2	3	—	—	—	—	64	35	7
9	7	2	1	1	2	—	1	—	—	—	63	28	11
10	3	—	1	—	—	1	—	1	—	—	30	17	5
11	3	1	—	1	—	—	—	—	—	1	33	17	6
12	3	—	—	—	—	1	1	—	1	—	36	22	9
13	1	—	—	—	1	—	—	—	—	—	13	5	3
	60	22	10	9	8	5	3	1	1	1	432	229	60

The attack rate on the whole number of the habitants of those 60 houses was therefore 53 per cent.; in houses having six inmates or less, 53·2 per cent. (exposed, 109; attacked, 58); in houses having more than six inmates, 52·9 per cent. (exposed, 323; attacked, 171). The fatality on the whole number of attacks was 26·2 per cent., or 17·2 per cent. in the smaller and 29·2 in the larger households.

Number of Inmates per House.	Exposed to Infection.				Attacked by Small-pox.			
	Vaccinated.	Under Vaccination.	Un-vaccinated.	Total.	Vaccinated.	Under Vaccination.	Un-vaccinated.	Total.
2	2	—	—	2	2	—	—	2
3	5	1	—	6	4	—	—	4
4	15	4	1	20	10	—	1	11
5	26	7	12	45	15	1	9	25
6	21	9	6	36	11	2	3	16
7	50	7	27	84	24	4	19	47
8	32	9	23	64	12	1	22	35
9	41	5	17	63	18	—	10	28
10	14	3	13	30	4	—	13	17
11	21	6	6	33	11	—	6	17
12	20	1	15	36	7	—	15	22
13	6	3	4	13	—	1	4	5
	253	55	124	432	118	9	102	229

The *proportion* of the vaccinated amongst all the inmates was 58·5 per cent.; of those undergoing vaccination, 12·7 per cent.; of the unvaccinated, 28·7 per cent. Amongst those who were attacked the proportions were, vaccinated, 51·5 per cent.; under vaccination, 4 per cent.; unvaccinated, 44·5 per cent.

In houses having six inmates or less the proportions amongst them were, vaccinated, 63·3 per cent.; under vaccination, 19·2 per cent.; unvaccinated, 17·4 per cent.; whereas amongst the attacked the proportions were, vaccinated, 72·4 per cent.; under vaccination, 5·1 per cent.; unvaccinated, 22·4 per cent.

In houses having more than six inmates the proportions amongst them were, vaccinated, 57 per cent.; under vaccination, 10·5 per cent.; unvaccinated, 32·5 per cent.; whilst amongst those who were attacked the proportions were, vaccinated, 44·4 per cent.; under vaccination, 3·5 per cent.; unvaccinated, 52 per cent.

The *attack rate* amongst all of the "vaccinated" class was 46·6 per cent.; of those under vaccination, 16·3 per cent.; unvaccinated, 82·2 per cent.

In the smaller households the attack rates were, for the vaccinated, 60·8 per cent.; under vaccination, 14·3 per cent.; unvaccinated, 68·4 per cent.

In the larger households the attack rates were, vaccinated, 41·3 per cent.; under vaccination, 17·6 per cent.; unvaccinated, 84·7 per cent.

SERIES D.

Number of Inmates per House.	No. of Houses.	Numbers attacked by Small-pox.								Total		
		2.	3.	4.	5.	6.	7.	8.	9.	Inmates.	Cases.	Deaths.
2	1	1	—	—	—	—	—	—	—	2	2	1
3	3	3	—	—	—	—	—	—	—	9	6	1
4	6	3	2	1	—	—	—	—	—	24	16	1
5	6	1	2	1	2	—	—	—	—	30	22	3
6	3	1	1	—	—	1	—	—	—	18	11	4
7	8	3	1	2	—	2	—	—	—	56	29	8
8	3	—	—	1	2	—	—	—	—	24	14	7
9	4	—	—	1	2	—	—	1	—	36	22	8
10	7	3	—	1	1	—	1	—	1	70	31	7
	41	15	6	7	7	3	1	1	1	269	153	40

The attack rate on the whole number of the habitants of these 41 houses was therefore 56·8 per cent.; in houses having six inmates or less, 68·6 per cent. (exposed, 83; attacked 57); in houses having more than six inmates, 51·6 per cent. (exposed, 186; attacked, 96). The fatality on the whole number attacked was 26·1 per cent., or 17·5 per cent. in the smaller and 31·2 per cent. in the larger households.

Number of Inmates per House.	Exposed to Infection.				Attacked by Small-pox.			
	Vaccinated.	Under Vaccination.	Un-vaccinated.	——	Vaccinated.	Under Vaccination.	Un-vaccinated.	——
2	2	—	—	2	2	—	—	2
3	7	—	2	9	4	—	2	6
4	16	3	5	24	10	1	5	16
5	19	1	10	30	11	1	10	22
6	10	1	7	18	3	1	7	11
7	35	14	7	56	17	5	7	29
8	13	3	8	24	4	2	8	14
9	19	2	15	36	7	—	15	22
10	41	14	15	70	14	3	14	31
	162	38	69	269	72	13	68	153

The *proportion* of vaccinated amongst all the inmates was, 60·2 per cent.; of those undergoing vaccination, 14·1 per cent.; of the unvaccinated, 25·6 per cent. Amongst those who were attacked the proportions were, 47·0 per cent.; under vaccination, 8·5 per cent.; unvaccinated, 44·4 per cent.

In houses having six inmates or less the proportions were, vaccinated, 65 per cent.; under vaccination, 6 per cent.; unvaccinated, 29 per cent.; whereas amongst the attacked there were, vaccinated, 52·6 per cent.; under vaccination, 5·2 per cent.; unvaccinated, 42·1 per cent.

In houses having more than six inmates the proportions were, vaccinated, 58 per cent.; under vaccination, 17·7 per cent.; unvaccinated, 24·2 per cent.; whilst amongst the attacked there were, vaccinated, 43·7 per cent.; under vaccination, 10·4 per cent.; unvaccinated, 45·8 per cent.

The *attack rate* amongst all of the "vaccinated" was 44·4 per cent.; of those "under" vaccination, 34·2 per cent.; of the unvaccinated, 98·2 per cent.

In the smaller households the attack rates were, vaccinated, 55·5 per cent.; under vaccination, 60 per cent.; unvaccinated, 100 per cent.

In the larger households the attack rates were, vaccinated 38·8 per cent.; under vaccination, 32·3 per cent.; unvaccinated, 97·7 per cent.

The foregoing figures demonstrate that although the attack rate was higher in those households where every one attacked with small-pox was kept at home than in those where they were all removed to hospital, yet that the proportion of the vaccinated inmates was nearly 10 per cent. higher in the former class (Series B). In the two other series where the initial case was removed (C) or retained (D) the attack rate was much higher, but so were the proportions of the unvaccinated inmates.

Indeed one of the most singular results of this analysis is to show that no matter what the conditions obtaining as regards isolation, the attack rates are inversely to the proportionate numbers exposed to infection, being as much lower amongst the vaccinated as they are higher amongst the unvaccinated. The mean proportion of the vaccinated members of the community was 64 per cent.; of the unvaccinated, 21 per cent.; but the mean attack rate was for the vaccinated 35 per cent., for the unvaccinated 79 per cent. For in round numbers the proportions of the *vaccinated* in each series were 65, 74, 58, 60, the attack rates amongst them being 22, 30, 46, 44, respectively. On the other hand the proportions of the *unvaccinated* members were 19, 13, 29, 25, their attack rates being 64, 72, 82, 98, respectively. A similar relationship exists whether smaller or larger households are dealt with, the main difference being the larger proportion of the unvaccinated in the larger households, owing to the preponderance of children in them. The somewhat mixed character of the class of those "under vaccination," most of whom perhaps are *quâ* modification to be grouped with the vaccinated, and many with the unvaccinated, may possibly account for a less constant variation; they form but a small proportion of those exposed, viz., from 4 to 8 per cent. in each series, whereas the attack rate amongst this class ranged from 8 to 34 per cent., the average being much below that of the vaccinated class.

GLOUCESTER.—LIST OF HOUSES KNOWN to have been INVADED by SMALL-POX from June 1895 to July 18th 1896.

N.B.—Houses in which particulars as to the remaining Inmates were not obtained given in *italics*.

Address.	Details as to all Inmates.	*Details of Cases only.*
Adelaide Street, 36, 51, *56*, 60, 78. Buxton Villa	5	*1*
Albany Street, 4, 7, 8, 9, 30, 36. "*Laburnum*" *Inn*	6	*1*
Albert Street, *5*, 12, 15, 20	3	*1*
Albion Street, Rose Villa	1	—
Alexandra Road, "Ingledene"	1	—
Alfred Street, 2, 3, 4, 6, 8, 10, 16, 18, 22, 62, *76*, 82, 106, and 108. Grove Villa	14	*1*
Alma Place, 1, 3, 5, 6, 7, 9, 10, 11, 12, 16, 23, 24, 25, 28, 31, 32, 33, 34, 35, 37, 39, 40, 41, 43, 46, 47, 48, 49, 50, 51, 52, 55, 56, 58, 61, 62, *72*, 78, 82, 88, 90, 94, 98, 100, 102, 104, 106, 108, 112, 114.	49	*1*
Alma Terrace, 1, 2, 4, 5, 6, 7, 8	7	—
Alvin Street, 20, 23, *24*, 25, 74. "*King William*" *Inn*	4	*2*
Archibald Street, 7, 19, 20	3	—
Arthur Street, *23a*	—	*1*
Avenue Road, Avenue Villa	1	—
Baker Street, 3, 7, 9, 10	4	—
Barbican Road, *5*	—	*1*
Barton Street (and Lower Barton Street), 9, 26, 28, 30, 46, *54*, 61, *66*, 74, 94, *96*, 97, *98*, 105a, *110*, 115, 118, 126, *128*, 129, 132, 138, 143, 163, 165, 196, 226. *Ballington Passage.* Barton Lawn. *Gothic Cottages, 1, 5.* "Homelands." Rose Cottage. St. James's Crescent, 4. Stanley Cottages, 2. Twin Cottages, 3. *Victoria Cottages, 1, 3. Wildman's Passage*, 3. *Whitehouse Passage.*	27	*13*
Barton Terrace, 16, 18, 23, 27, 41, *48*, 55, 59, *63*, *103*	7	*3*
King's Barton Street, 1, *16*. Witticomb Terrace, 1	2	*1*
Bedford Street, 7	1	—
Birchmore Road, 3, 7, 18, *29*, 30, 34	5	*1*
Bishopstone Road, 3	1	—
Blackfriars, 6, 16	2	—
Blenheim Road, 7, 11, 20, *28*, 47, 55, 65	6	*1*
Bristol Road, *40*, 53, 61, *69*, 101. "*P.O.*" *Quedgley Villa. Berkeley Villa*	3	*5*

Address.	Details as to all Inmates.	*Details of Cases only.*
Brook Street, *14*, 20, 47, *57*, 59, 63, 65, 68	6	*2*
Bull Lane, 16	1	—
Cambridge Street, 18	1	—
Carmarthen Street, 1, 4, 8, 13, 16, 20, 21, 22, 24, 25, 26	11	—
Castle Street, 2, 3, 4, 5, 6, 10, 13, 16, 17, *20*, 25, 27, *30*, 33, *34*, 35, 45, 46, 51, 53, 58, 60, *74*.	19	*4*
Cecil Road, 1, *4*, *8*, 11, 12, 15, 20, 28, 31, 32	—	—
Cecil Road (Upper), — ?, *2*. Mace's Buildings. *Hillview Terrace, 4*	10	*4*
Church Street, *5*, 11	1	*1*
Chapel Street, St. Mary's Square, 6	1	—
Charles Street, *11*, 20	1	*1*
Clarence Street, 5	1	—
Clegram Road, 6, 26, 27, 28, 29, 31, *33*. Alexandra Villa, 3, 4. Cavendish House. Clare Terrace, 1, 2, 4, 5. Clegram Villas, 1, 2. Florence Villas, 1. Hope Villa. Roath Villas, 1.	18	*1*
Clement Street, 3, 9, 12, 13, 14, 15, 24, 27, 28, 34, 39, 42, 48, 56. Clement Cottages, *1*, 2, 3.	16	*1*
Clifton Road, *2*, 6, 11, 24, 26, 28, 34, *58*, 60	7	*2*
Clifton Terrace, 44, 46	2	—
Conduit Street, 3, 8, 13, 14, 16, 21, *36*, 68. Fowey Villas, *1*, 2. Prospect House	9	*2*
Counsel Street, *4*, 7, 9, *15*	1	*3*
Dainty Street, *3*, *6*, 9, 10, 11, 12	4	*2*
Daventry Terrace, 2, 4	2	—
Deacon Street. *Tory Cottage, 5*	—	*1*
Derby Road, *5*, *7*, 9, *34*, 37, 42, 44, 46, 48. Lyppiatt Villa	7	*3*
Dineley Street, *3*, 23	1	*1*
Ducie Street, 6, 8, *13*, 19, 23, 31, *33*, *35*, 41, 43, 55, 57. Ducie Cottage, *6*, 10	10	*4*
Dynevor Street, 3, 4, 6, 10, 12, 21, 27	7	—
"Docks." *Lighter—"George"*	—	*1*
Eastend Road, 20, 39, 41, 50, 62	5	—
Exhibition Street, 3, *4*, 10	2	*1*
Farnbrook Terrace, *3*	—	*1*
Falkner Street, 1, 9, 38, 75, 75a, 99, 100, 107. Elm Villa. *Rock Villa*	9	*1*
Forest Terrace, 2, 3, 4, 5, 9, 14	6	—
Gardiner's Row, 2	1	—
Goodyer Street, *5*	—	*1*
Grove Street, 11, 19	2	—
Guinea Street, 2, 16	2	—
Hanman's Road, 2, 14, 26, 30, 39, *40*, 45, 48	7	*1*
Hare Lane, *15*, *78*	—	*2*
Henry Street, 2	1	—
Herbert Road, 2, *10*, 11, 14, 16, *19*	4	*2*
Hethersett Road, 16	1	—
High Street, 45, 51, 115, 117, *121*, *122*, 128, 149, 161, 191	8	*2*
Hopewell Street, 4, 10, 15, 18, 19, 20, 21, 32, 34, 38, 47, *49*, 56, 58. "Robin Hood" Inn.	14	*1*
Howard Street, 3, 29, 38, 57, *58*, 63, 65, 75, 101, 105	9	*1*
Hyde Lane, *21*	—	*1*
India Road, 2, 10, 21, 25, 28, 30, 50, 60, 66, *68*, 74	10	*1*
Jersey Road, 1, 8, 10, 13, 22, 24. Falcon Villa	7	—
Knowles Road — ?, 5, 6, 11, 14, *22*, 24, 27. "Anniville." Windsor Terrace, 2	9	*1*
Ladybellgate Street, 2, 3, 6	3	—
Linden Road, 5, 10, 12, 23, 55, 56, 65, 81. *Board School.* Blomfield Terrace, 1. "Fernleigh." Linden Terrace, 1, 3, 4. "Lyndhurst." "Morningside," 3, 6. Sunningdale Terrace, *6*, 12. Woodbine Cottage.	18	2
Llandilo Street, 2, 8, *12*, *15*	2	*2*
Llanthony Cottages, 2, 3	2	—
Llanthony Road, 4, 22	2	—
London Road, 68	1	—
Longsmith Street, 29, 38. *Brown's Lodging House.* Pridey's Passage	3	*1*
Magdala Road, 7, 9, *15*, *19*, 27, 35	4	*2*
Magdala Terrace, 1, 2, 10, 23, 25	5	—
Matson Place, 9, 10, 21	3	—

Address.	Details as to all Inmates.	*Details of Cases only.*
Melbourn Street, 4, 9, 10, 16, 18, 21, 22, 25, 26, 27, 30, *32*, 33, *37*, 40, 42, 47, 52, 56, 70, 71, 76, 78, 108, 110, 112, 114, 118, 122, 124, 142, 164.	30	*2*
Midland Road, 38. Midland Railway Crossing Cottage	2	—
Milbrook Street, 8, 16, 17, 23, 29, 45, *49*, 60, 68, 76, 77, 78, *82*, 86, *116*, 126, 132. "Bee-hive" Inn. Old Row, 10. Vauxhall Terrace, 3, 4, *8*. Windsor Place, 3, 7, 9.	21	*4*
Mill Street, 1, 6	2	—
Mitre Street, 12, *31*	1	*1*
Moor Street, *5*, *15*, *27*, 32, *33*, 38, 48, 54, *54a*, 64	5	*5*
Morpeth Street, *5*, 10, 16, 20, 24, *29*, 30, 31, 34. *Elmstone Villa*	7	*3*
Morton Street, 9, 10, 11, 13, 24, 26, 28, 30, 34, 38, 41, 44, 45, *45a*, 46. George's Row, 3, 4, *5*, 6, 7.	18	*2*
Napier Street, 4, 5, 6, 10, 12, 18, 26, *44*, 51, 61, 63	10	*1*
Nelson Street, 8, 9, 10, 11, 19, 23, 25, 27, 29, 33, *39*, 40, 42, 44, 48	14	*1*
New Street, 2, 5, 6, 7, 12, 14, 16, 21, 25, 26, 27, 28, *30*, *39*, 40, 41, 42, 43, 44, 47, 51, 55, 56, 57, 60, 61, 62, 63, 64, *65*, 70, 76, 80, 80 (*bis*), 81, *83*, 85, 86, 88, 91, *98*, 100, 106, 110, 111, 113, 120.	42	*5*
Norfolk Street. Goulder's Yard, 2	1	—
Northgate, 52. "Black Dog" Inn	2	—
High Orchard Street, —?, *1*, 4, 10	2	*2*
Oxford Terrace, 6	1	—
Painswick Crossing Cottage	1	—
Park Road, 28. Havelock Terrace, 8	2	—
Parkend Road, 13, *51*. *"Ellesmere" Hanman's Terrace, 3*	1	*3*
Parliament Street, 3. Brisbane Cottages	1	*1*
Paul Street, 1, 6, *8*, 12, *16*, *18*	3	*3*
Pembroke Street, 9, 20	2	—
Percy Street, 15, *17*	1	*1*
Philip Street, 12, 13, 14, 19, 20, 30, 38, *42*, 51	8	*1*
Portland Street, 10	1	—
Prince's Street, 12, 15, *23*, *28*, 41	3	*2*
Priory Road, 102	1	—
Quay Street. *Norman's Row, 3*	—	*1*
Raglan Street, 3, 4, 6	3	—
Regent Street, 1, 19, 24, 42, 60, 62, 65, 67, 81, 82. *Belgrave Terrace, 3*	10	*1*
Robin Hood Street, 1, 6, 13, 14, 17, 20, 26, 28, 29, 32, 34, 37, 39, 43, 45, 46, 48, 49, 50, 54, 55, 60, 62, 68.	24	—
Russell Street, 18	1	—
Ryecroft Street, 10, 12, 15, 19, 33, 36, 39, 41, 45, 53, 57, 61, *74*, *113*, 121	13	*2*
St. Catherine Street, 56, 83	2	—
St. James's Street, 1, 2, 6, 7, 8, 9, 11, 12, 22, *24*, 26, 28, 30, 34, 52. Alma Place, 1, 3, 6	16	*2*
St. John's Lane, *23*	—	*1*
St. Luke Street, —?, 7	2	—
St. Mark Street, 23, 51	2	—
St. Mary's Square, *26*. Clare Street, 1	1	*1*
St. Nicholas Terrace, Quay, *4*	—	*1*
St. Paul's Road, 3, 12, 15, 24, 30, 31, 32, *34*, 50, 57. 5 Wyndale Terrace. "Northernhay."	11	*1*
Salisbury Road, 24, 26, 33, 37, 50, *62*, 64	6	*1*
Sebert Street, 14, 16, 56	3	—
Seymour Road, 3, *5*, *7*, 36. Alma Road. Clarence Villa. Eunice Villa. Fernlea Villa, 5. *Grove Villa, 1*, St. Anne's Terrace, 1. Thornmead Villa, 3.	8	*3*
Shakespeare Passage, —?	—	*1*
Sherborne Street, 2, 8, 13, *20*, 22, 40, 42, 43, 44, 68, 70, *80*, *84*, 90. *Wells Cottage, 3, 4*.	10	*6*
Sidney Street, 19, 26, 27, 35	4	—
Sinope Street, 2, 12, 18, 21, 29, 32, 34, 40	8	—
Slaney Street, 2 Henry Place	1	—
Somerset Place, 4, 11	2	—
Southgate, 106. Raglan Terrace, 3. *Sudbrook House*. *"Wheatsheaf" Inn*	2	*2*
Spa Road, "Severndale"	1	—
Station Road, "*Bleak House*"	—	*1*
Stratton Road, 1a, 11, 13, *14*, 34, *46*, 58	5	*2*
Stroud Road, 4, 10, 11, 17, 21, 23, 27, 35, 37, 41, 43, 59. *Bath Buildings, 4, 9*. Cut Hill House. Elm Villa. *Laurel Villa*. *Lorne Villa*. Windsor Villa.	15	*4*
Suffolk Street, 46, *59*, 60, 70	3	*1*
Swan Lane, *17*. Turles Yard, 6	1	*1*
Sweetbriar Street, 4, *21*, 60	2	*1*
Sydenham Terrace, 7, 11, 13, 19	4	—

Address.	Details as to all Inmates.	*Details of Cases only.*
Theresa Street, 1, 7, 17, *23*, 24, 26, 31, *35*, *39*, 41, *43*, 49, *61*	7	*6*
Old Tram Road, 5, 7	2	—
Tredworth Road, 2, 9, *15*, *18*, 19, *20*, 21, 24, 25, 34, 42, 44, 51, 59. "Round House"	12	*3*
Tweenbrook Villas	—	*1*
Twyver Street, 6, 7, 10, 16, 19, 23, 26, 37, 41	9	—
Union Street, 7, 11, 23, 27. *Railway Cottages, 1*	3	*2*
Union Workhouse	—	*1*
Upton Street, *8*, *13*, 14, 17, 24, 35, *65*	4	*3*
Vauxhall Road, *1*, 5, 9, 11, 21, 26, 27, 38, 54, 59, 68	10	*1*
Victoria Street, 8, 9, 10, 22, 25, *27*, *28*, 29, 30, 37, 39, 47, 55, 56, 60, 62, *68*, 75, 80, 96	17	*3*
Victory Road, 1, *4*, 9, 10, 14, 19, *22*, *24*, 25, 26, 30, 31, 32, 35, 37, 39. Massey Parade, 1, 2, *3*, *4*.	15	*5*
Wellesley Street, 1, 2, 11, 17, 24, 26, *27*, 28, 29, 34, 36, 46, 48	12	*1*
Wellington Street, 5, *11*, 15, 20, 26, 34, 42	6	*1*
Westend Parade, 4	—	*1*
Westgate (Lower), *23*, *46*, 90, *114*. Forester's Court, 1. Levi's Court, 2, *9*. Quay Court, 3. *Smith's Lodging House.* Stephens Court, 1, 2, *3*, *4*, *5*, *6*.	6	*9*
Weston Road, 17, 28, 30. Lorraine Villa. Tyndale Manse	5	—
Widden Street, 10, 25, 29, 30, 32, 43, 48, 60. Sydney Villa	9	—
Windmill Parade, 8, *28*	1	*1*
Worcester Parade, *13*, 21	1	*1*
Worcester Street, 26, 57, 63	3	—
Worrall Street, *18*, 20, 22, 24, 35. Worrall Court, 1, 2, 3	7	*1*
Total	899	199
	1,098	

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9. „ „ „ 25, 1896 (p. 56).
10. „ „ May 9, 1896 (p. 60).
11. „ „ „ 23, 1896 (p. 62).
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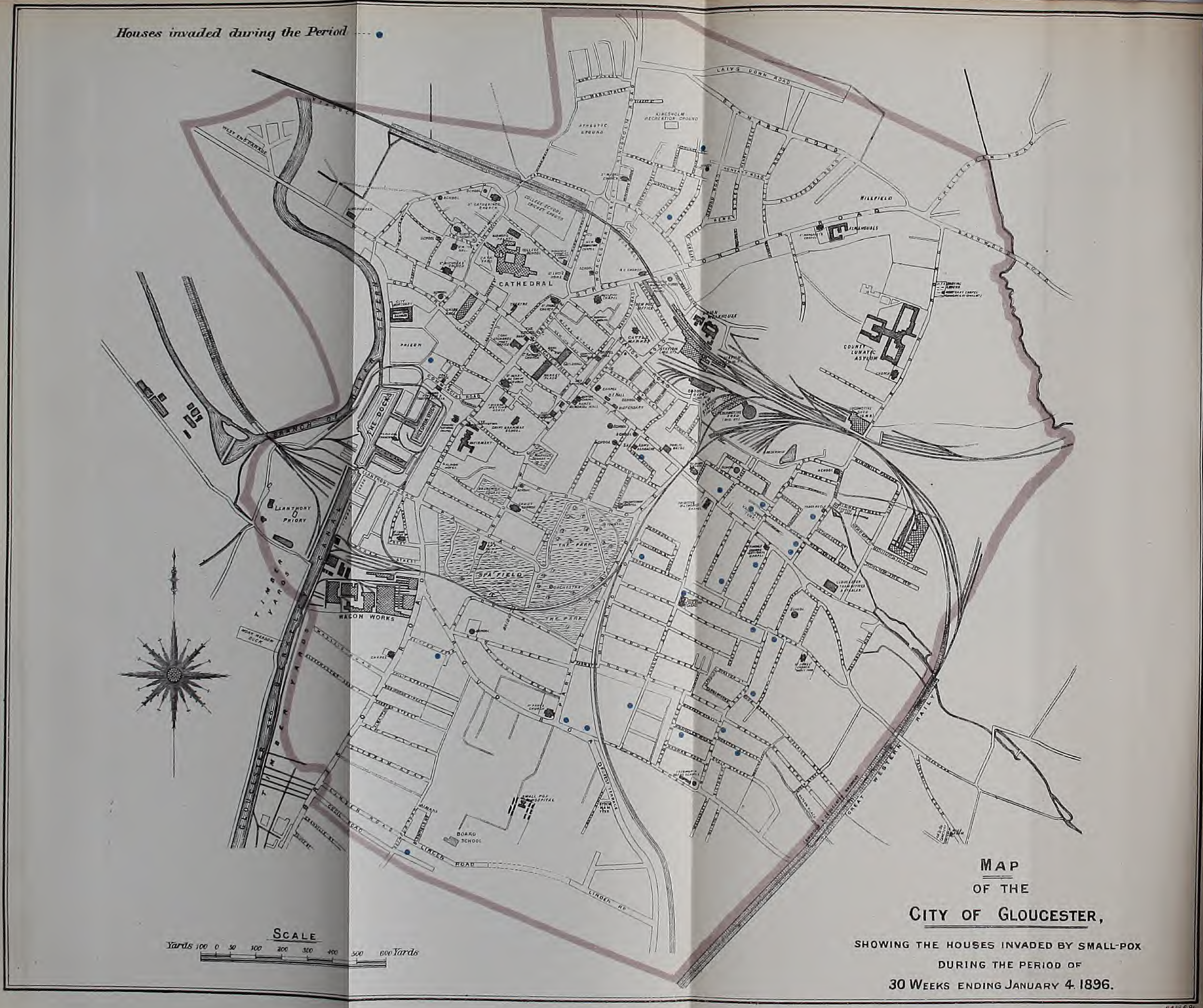
Map 16.—Spot-map indicating the situation of houses invaded by small-pox during the epidemic, as well as the population density of the four registration sub-districts of Kingsholm, St. Nicholas, South Hamlet, and St. John Baptist - - - - 182

I.



MAP
OF THE
CITY OF GLOUCESTER,
SHOWING THE HOUSES INVADED BY SMALL-POX
DURING THE PERIOD OF
30 WEEKS ENDING JANUARY 4. 1896.

8438.6.96

EXPLANATION OF THE MAPS.

The march of the epidemic may be followed in the accompanying series of 15 maps, the first of which indicates the situation of the houses known to have been invaded by small-pox from the beginning of the outbreak to January 4th, 1897, a period of 30 weeks. Maps II. to XV. indicate the house invasions during each subsequent fortnight, the new invasions being marked by blue dots, those previously invaded by red dots. During the whole epidemic 1,098 houses were known to have been invaded, and they occurred in 155 different streets. To facilitate the study of these maps there is affixed to each a list of the streets thus invaded, but fuller details will be found in the Report, pages 36 to 68.

MAP I.

Houses invaded during the 30 weeks ending January 4, 1896 (*see* page 36).

Streets invaded (20).

Barbican Road, 1; King's Barton Street, 1; Cecil Road, 1; Clifton Road, 1; Conduit Street, 2; Counsel Street, 1; Derby Road, 3; Goodyer Street, 1; High Street, 1; Knowles Road, 1; Milbrook Street, 2; Moor Street, 1; Morton Street, 1; Rycroft Street, 1; Sherborne Street, 1; Sinope Street, 1; Stratton Road, 1; Stroud Road, 2; Upton Street, 1; Vauxhall Road, 1.

Total houses invaded, 25.

MAP II.

Houses invaded during the Fortnight ending January 18, 1896 (*see* page 37).

(a) *In Streets not previously invaded* (9).

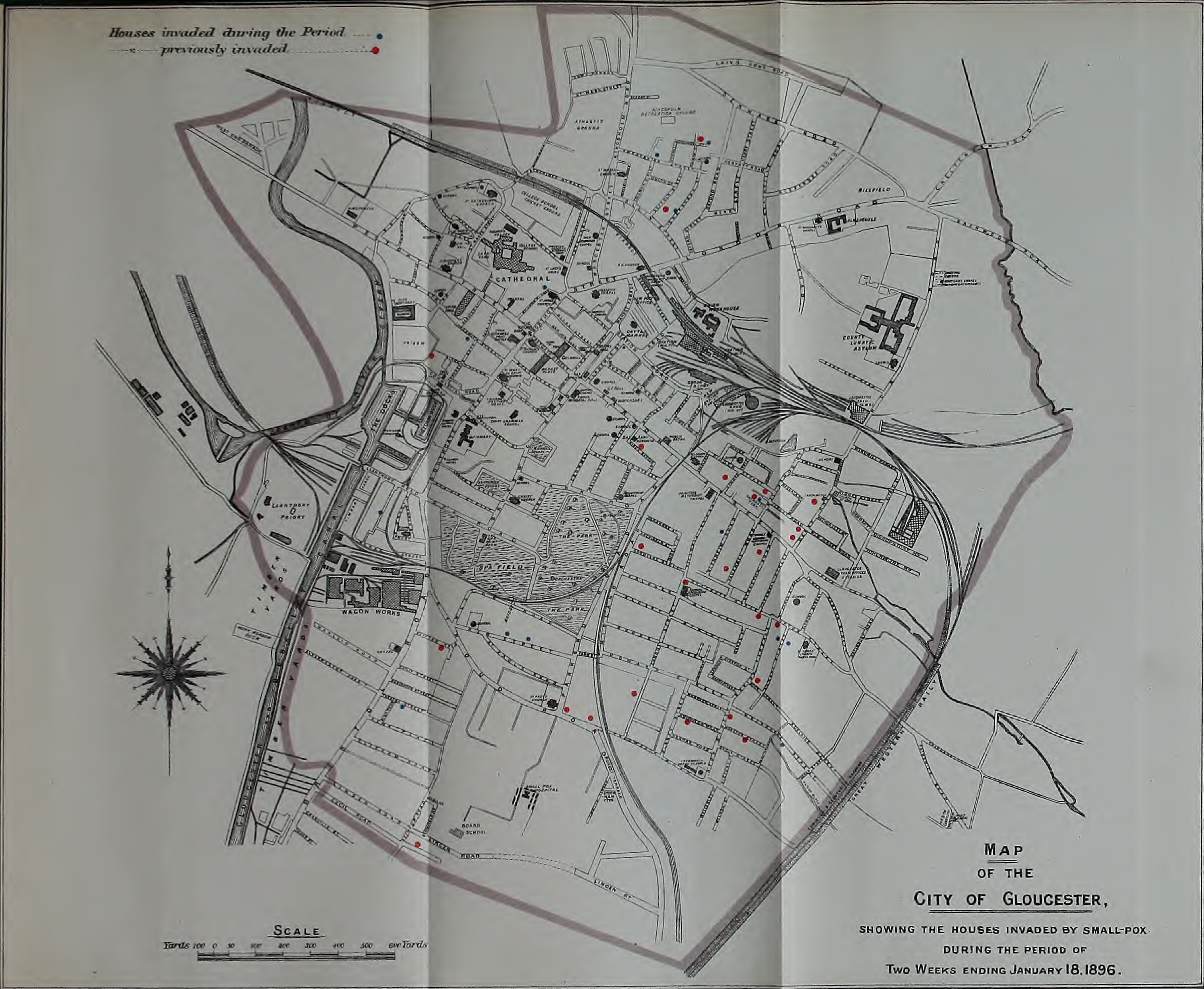
Albany Street, 2; Blenheim Road, 1; Guinea Street, 1; Longsmith Street, 1; Melbourn Street, 1; New Street, 2; High Orchard Street, 1; St. John's Lane, 1; Theresa Street, 1.

(b) *In Streets previously invaded* (3).

Counsel Street, 1; Milbrook Street, 1; Sherborne Street, 1.

Total houses newly invaded - - - - - -	14
„ previously invaded - - - - -	25
	39

II.



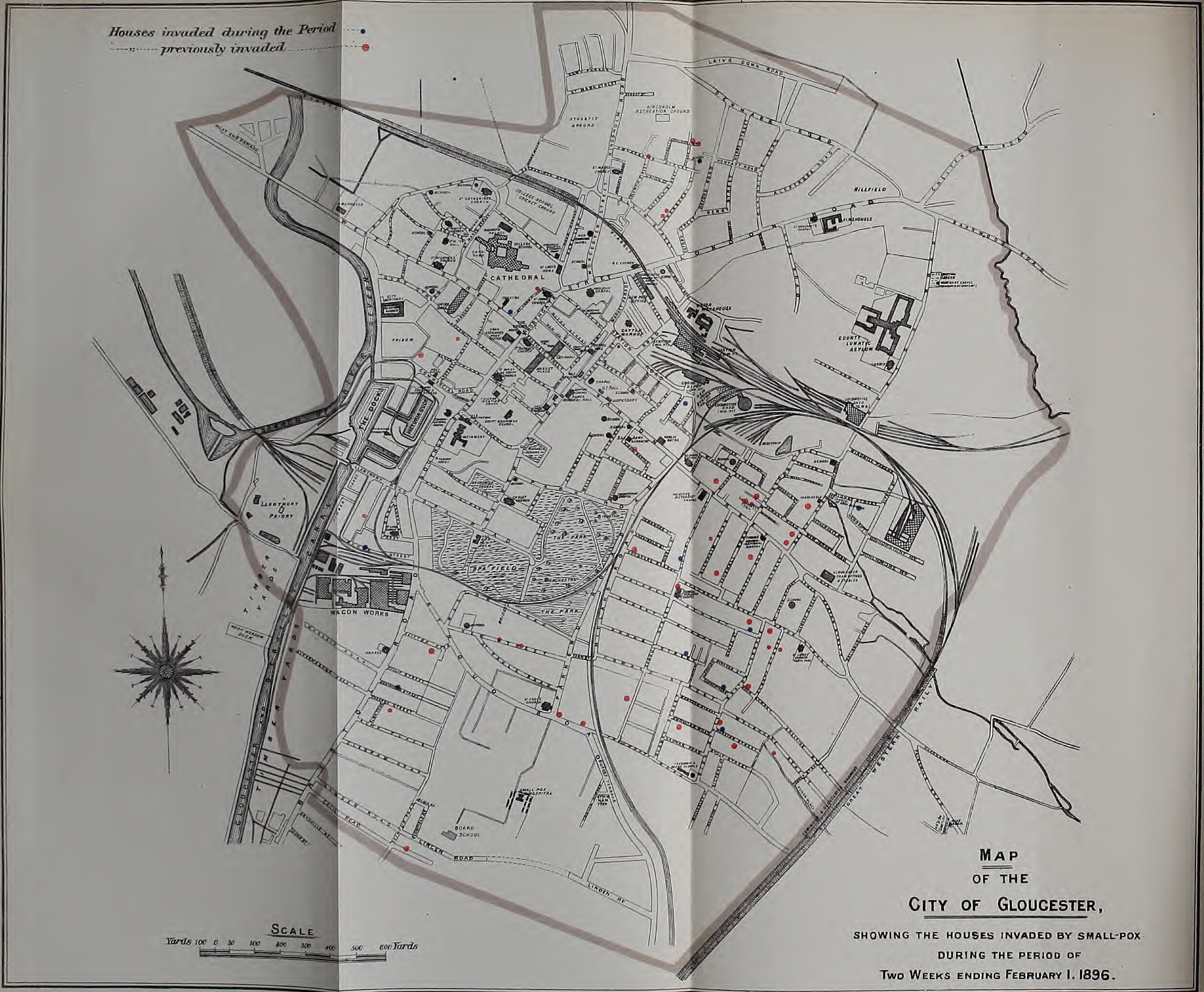
Houses invaded during the Period ....●

„ „ *previously invaded*....●

MAP
OF THE
CITY OF GLOUCESTER,

SHOWING THE HOUSES INVADED BY SMALL-POX
DURING THE PERIOD OF
TWO WEEKS ENDING JANUARY 18.1896.

8436.6.96



MAP
OF THE
CITY OF GLOUCESTER,

SHOWING THE HOUSES INVADED BY SMALL-POX
DURING THE PERIOD OF
TWO WEEKS ENDING FEBRUARY 1. 1896.

MAP III.

Houses invaded during the Fortnight ending February 1, 1896 (*see* page 38).

(a) *In Streets not previously invaded* (9).

Baker Street, 1; Brook Street, 1; Carmarthen Street, 1; Falkner Street, 1; Robin Hood Street, 1; Shakespeare Passage, 1; Sidney Street, 1; Station Road, 1; Victoria Street, 1.

(b) *In Streets previously invaded* (1).

High Street, 1.

Total houses newly invaded - - - - - -	10
,, previously invaded - - - - - -	39
	49

MAP IV.

Houses invaded during the Fortnight ending February 15, 1896 (*see* page 39).

(a) *In Streets not previously invaded* (15).

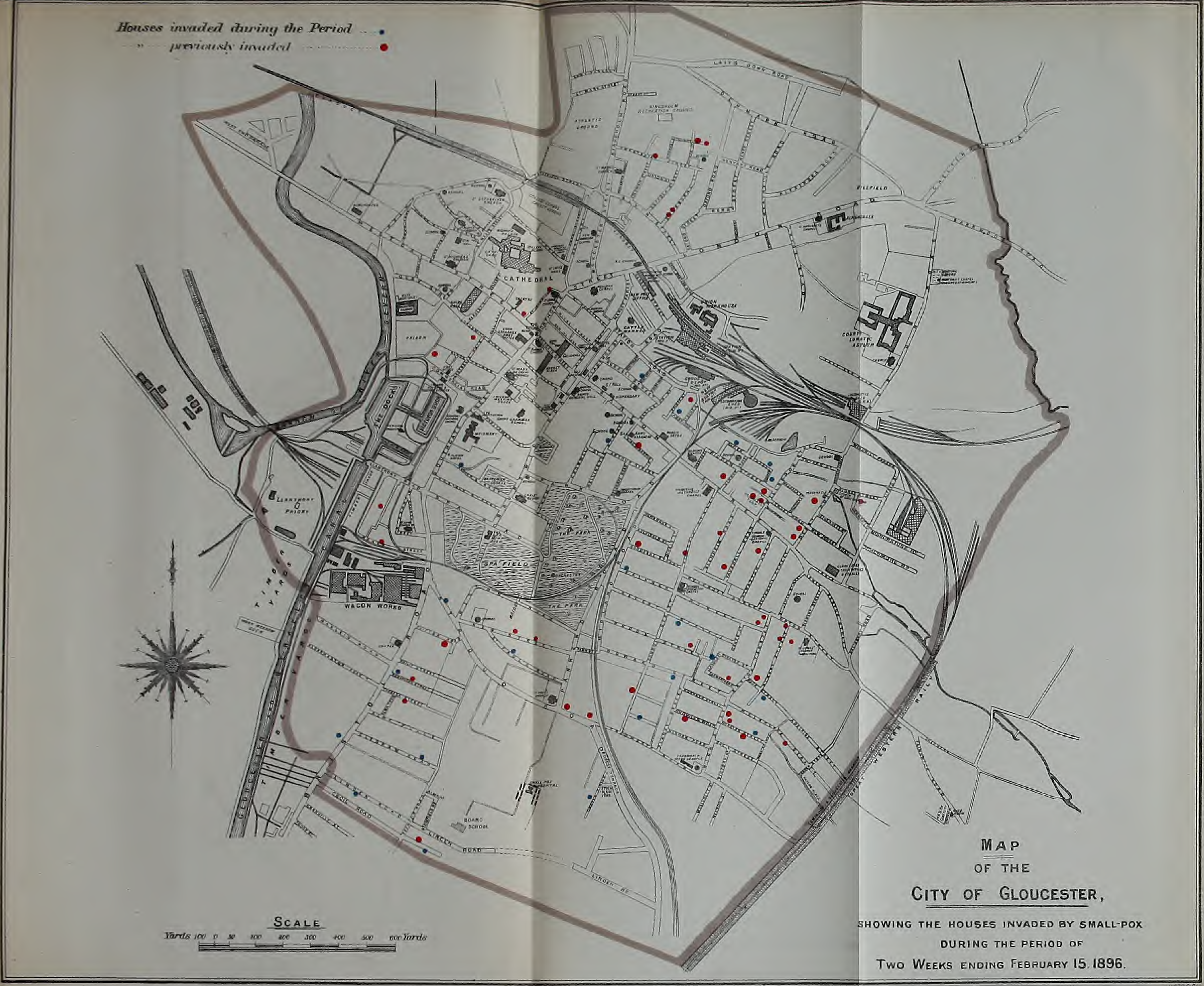
Albion Street, 1: Bedford Street, 1; Bristol Road 1; Castle Street, 1; Clegram Road, 1; Dynevor Street, 1; Hanman's Road, 1; Howard Street, 1; Linden Road, 1; Napier Street, 2; Princes Street, 1; Raglan Street, 1; Regent Street, 1; St. Paul's Road, 1; Wellington Street, 1.

(b) *In Streets previously invaded* (6).

Cecil Road, 1; Falkner Street, 1; Moor Street, 1: Morton Street, 1; Robin Hood Street, 1; Stroud Road, 1.

Total houses newly invaded - - - - - -	22
,, previously invaded - - - - -	49
	71

IV.

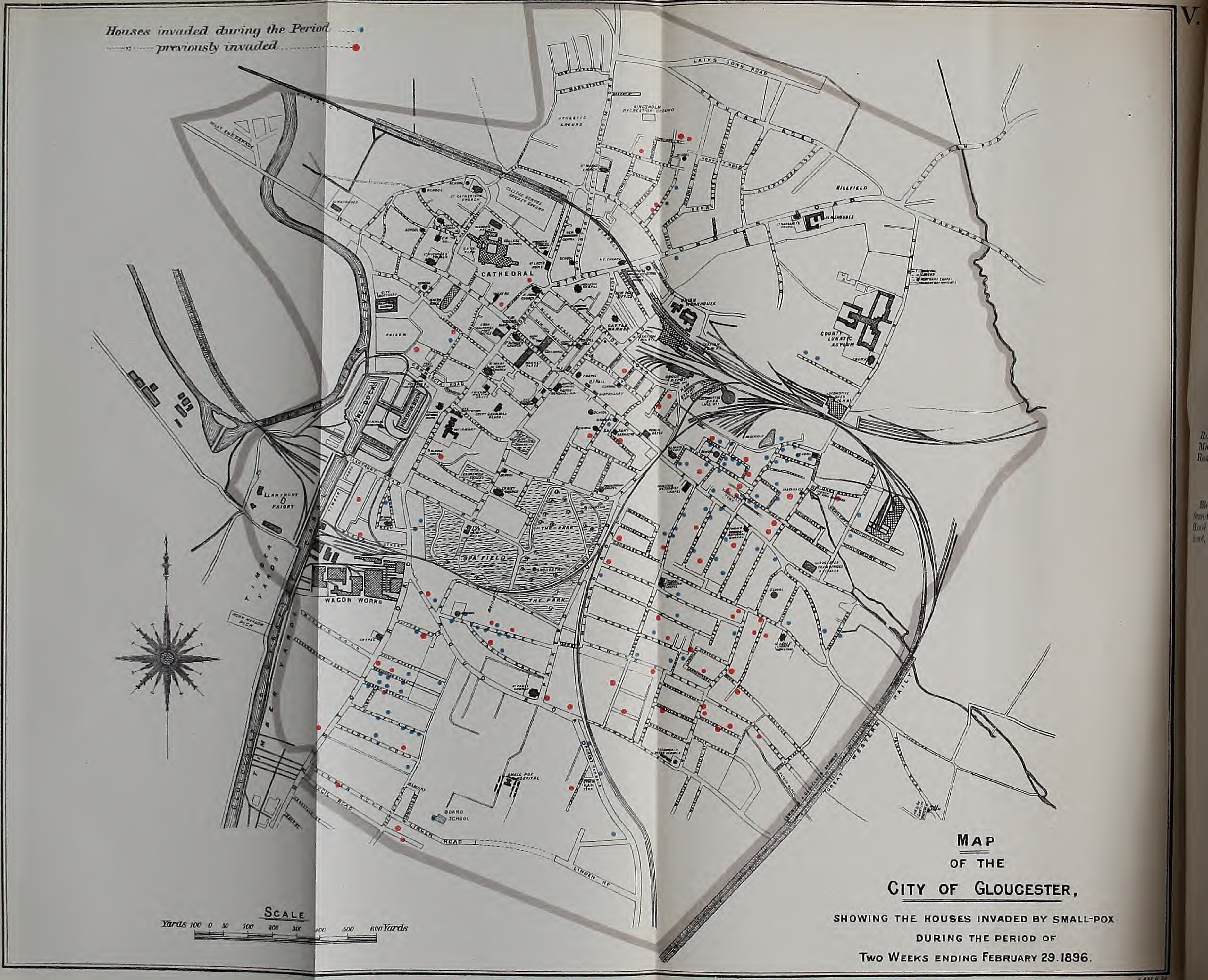


MAP
OF THE
CITY OF GLOUCESTER,
SHOWING THE HOUSES INVADED BY SMALL-POX
DURING THE PERIOD OF
TWO WEEKS ENDING FEBRUARY 15. 1896.

8436 6 96.

V.

Houses invaded during the Period ..... ●
„ previously invaded ..... ●



MAP
OF THE
CITY OF GLOUCESTER,

SHOWING THE HOUSES INVADED BY SMALL-POX
DURING THE PERIOD OF
TWO WEEKS ENDING FEBRUARY 29. 1896.

MAP V.

Houses invaded during the Fortnight ending February 29, 1896 (*see* page 40).

(a) *In Streets not previously invaded* (22).

Alfred Street, 2; Alma Place, 5; Barton Street, 6; Barton Terrace, 1; Dainty Street, 1; Eastend Road, 2; Forest Terrace, 2; Hopewell Street, 1; Jersey Road, 2; Ladybellgate, 1; Llandilo Street, 1; Magdala Road, 1; Magdala Terrace, 1; Midland Road, 1; Oxford Terrace, 1; St. Luke Street, 1; Salisbury Road, 1; Seymour Road, 2; Somerset Place, 2; Tweenbrook Villas, 1; Twyver Street, 3; Widden Street, 3.

(b) *In Streets previously invaded* (22).

Blenheim Road, 3; Brook Street, 1; Clegram Road, 1; Clifton Road, 1; Falkner Street, 2; Howard Street, 1; Linden Road, 1; Milbrook Street, 7; Napier Street, 4; New Street, 7; Regent Street, 1; Robin Hood Street, 4; St. Paul's Road, 1; Sherborne Street, 2; Sinope Street, 2; Stratton Road, 1; Stroud Road, 1; Theresa Street, 4; Upton Street, 1; Vauxhall Road, 2; Victoria Street, 4; Wellington Street, 1.

Total houses newly invaded - - - - - -	93
„ previously invaded - - - - -	71
	164

MAP VI.

Houses invaded during the Fortnight ending March 14, 1896 (*see* page 43).

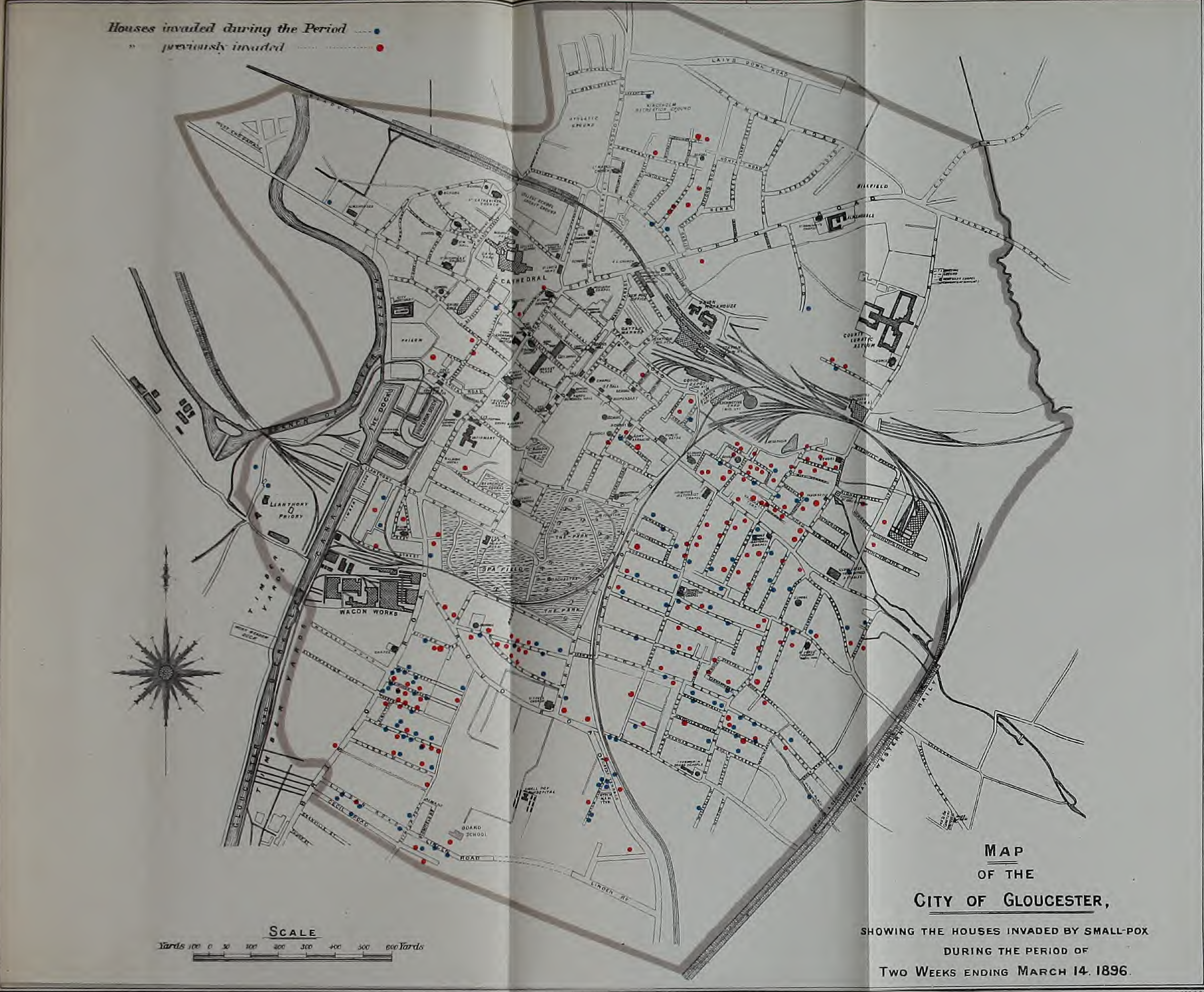
(a.) *In Streets not previously invaded* (20).

Adelaide Street, 1; Albert Street, 1; Alvin Street, 2; Dincley Street, 1; Ducie Street, 1; Exhibition Street, 1; Farnbrook Terrace, 1; Llanthony Cottages, 1; Llanthony Road, 1; Matson Place, 1; Morpeth Street, 4; Parkend Road, 1; Pembroke Street, 2; Philip Street, 5; St. James's Street, 1; Sebert Street, 1; Sydenham Terrace, 1; Tredworth Road, 2; Wellesley Street, 1; Westgate, 2.

(b.) *Streets previously invaded* (41).

Alfred Street, 1; Alma Place, 7; Barton Street, 1; Barton Terrace, 1; Blenheim Road, 1; Bristol Road, 2; Brook Street, 2; Carmarthen Street, 1; Castle Street, 5; Cecil Road, 3; Clegram Boad, 2; Clifton Road, 1; Conduit Street, 3; Eastend Road, 1; Falkner Street, 3; Forest Terrace, 1; Hanman's Road, 1; High Street, 1; Hopewell Street, 2; Howard Street, 1; Linden Road, 6; Magdala Terrace, 2; Melbourn Street, 3; Milbrook Street, 1; Morton Street, 3; New Street, 5; High Orchard Street, 1; Raglan Street, 1; Regent Street, 2; Robin Hood Street, 6; Rycroft Street, 1; St. Paul's Road, 1; Salisbury Road, 1; Seymour Road, 2; Stratton Road, 1; Theresa Street, 2; Upton Street, 2; Vauxhall Road, 3; Victoria Street, 1; Wellington Street, 1; Widden Street, 2.

Total houses newly invaded - - - - - -	118
„ previously invaded - - - - -	164
	282



MAP
OF THE
CITY OF GLOUCESTER,
SHOWING THE HOUSES INVADED BY SMALL-POX
DURING THE PERIOD OF
TWO WEEKS ENDING MARCH 14. 1896.

Str
Str
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Br
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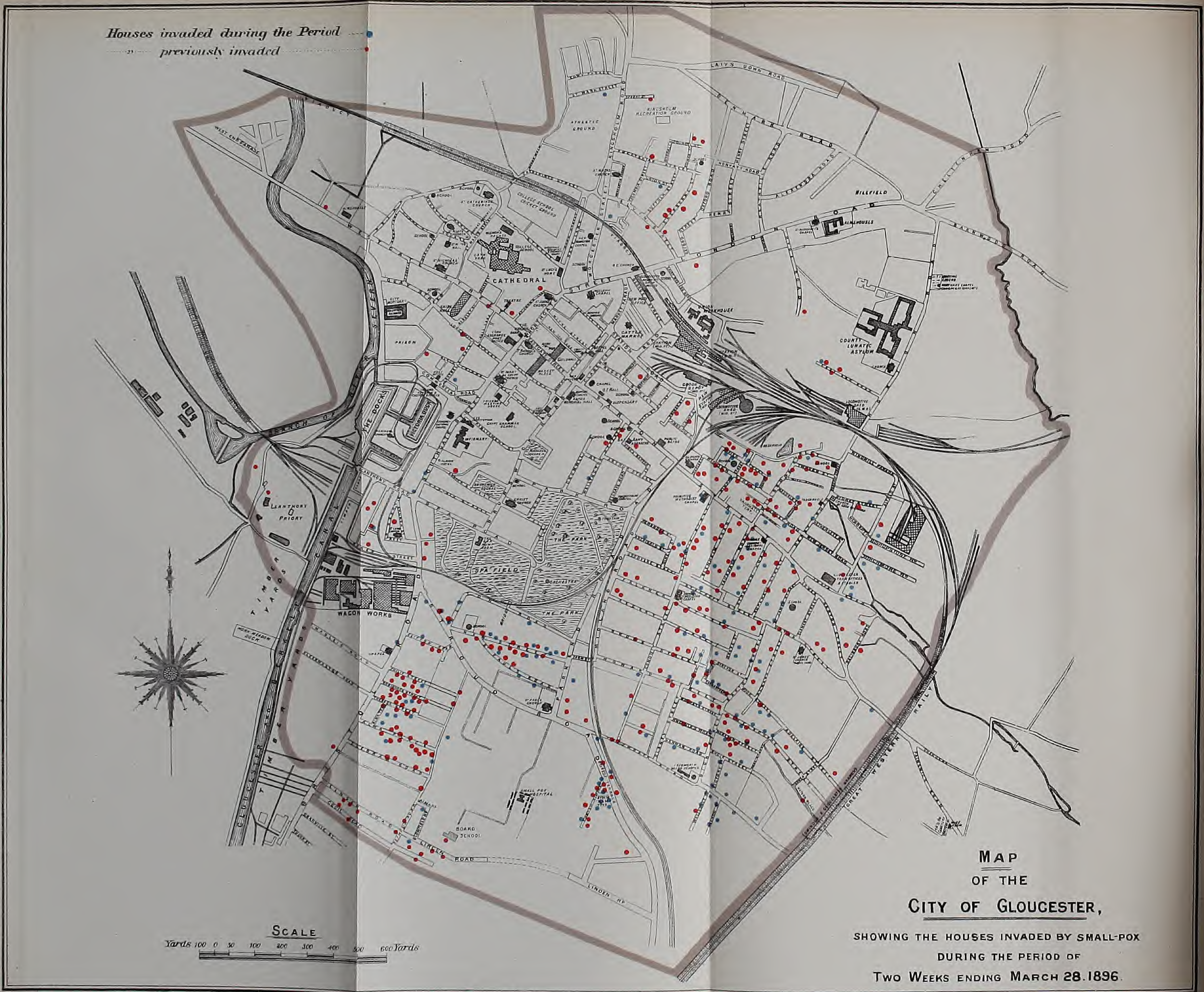
Str



MAP
OF THE
CITY OF GLOUCESTER,

SHOWING THE HOUSES INVADED BY SMALL-POX
DURING THE PERIOD OF
TWO WEEKS ENDING MARCH 28.1896.

8418.6.96.

MAP VII.

Houses invaded during the Fortnight ending March 28, 1896 (*see* page 47).

(a.) *In Streets not previously invaded* (14).

Alma Terrace, 2 ; Archibald Street, 2 ; Birchmore Road, 1 ; Daventry Terrace, 1 ; Grove Street, 2 ; India Road, 2 ; Nelson Street, 3 ; Paul Street, 1 ; St. Mark Street, 1 ; Southgate, 1 ; Union Street, 1 ; Victory Road, 3 ; Weston Road, 2 ; Worcester Street, 1.

(b.) *In Streets previously invaded* (56)

Adelaide Street, 1 ; Alfred Street, 3 ; Alma Place, 1 ; Baker Street, 1 ; Barton Street, 4 ; Barton Terrace, 2 ; Blenheim Road, 1 ; Bristol Road, 1 ; Carmarthen Street, 2 ; Castle Street, 5 ; Cecil Road, 1 ; Clifton Road, 1 : Conduit Street, 1 ; Dainty Street, 1 ; Derby Road, 1 ; Dineley Street, 1 ; Ducie Street, 1 ; Eastend Road, 1 ; Falkner Street, 1 ; Forest Terrace, 1 ; Hanman's Road, 3 ; Hopewell Street, 1 ; Howard Street, 2 ; Jersey Road, 2 ; Knowles Road, 1 ; Ladybellgate, 1 ; Llandilo Street, 1 ; Llanthony Road, 1 ; Magdala Road, 1 ; Melbourn Street, 6 ; Millbrook Street, 2 ; Moor Street, 2 ; Morpeth Street, 1 ; Morton Street, 2 ; Napier Street, 3 ; New Street, 9 ; Parkend Road, 1 ; Philip Street, 1 ; Regent Street, 2 ; Robin Hood Street, 2 ; Rycroft Street, 4 ; St. James's Street, 1 ; St. Paul's Road, 3 ; Seymour Road, 3 ; Sidney Street, 1 ; Sinope Street, 3 ; Stratton Road, 2 ; Stroud Road, 4 ; Sydenham Terrace, 3 ; Theresa Street, 2 ; Tredworth Road, 3 ; Vauxhall Road, 4 ; Victoria Street, 2 ; Wellesley Street, 3 ; Wellington Street, 1 ; Widden Street, 1.

Total houses newly invaded - - - - -	138
„ previously invaded - - - - -	282
	420

MAP VIII.

Houses invaded during the Fortnight ending April 11, 1896 (*see* page 51).

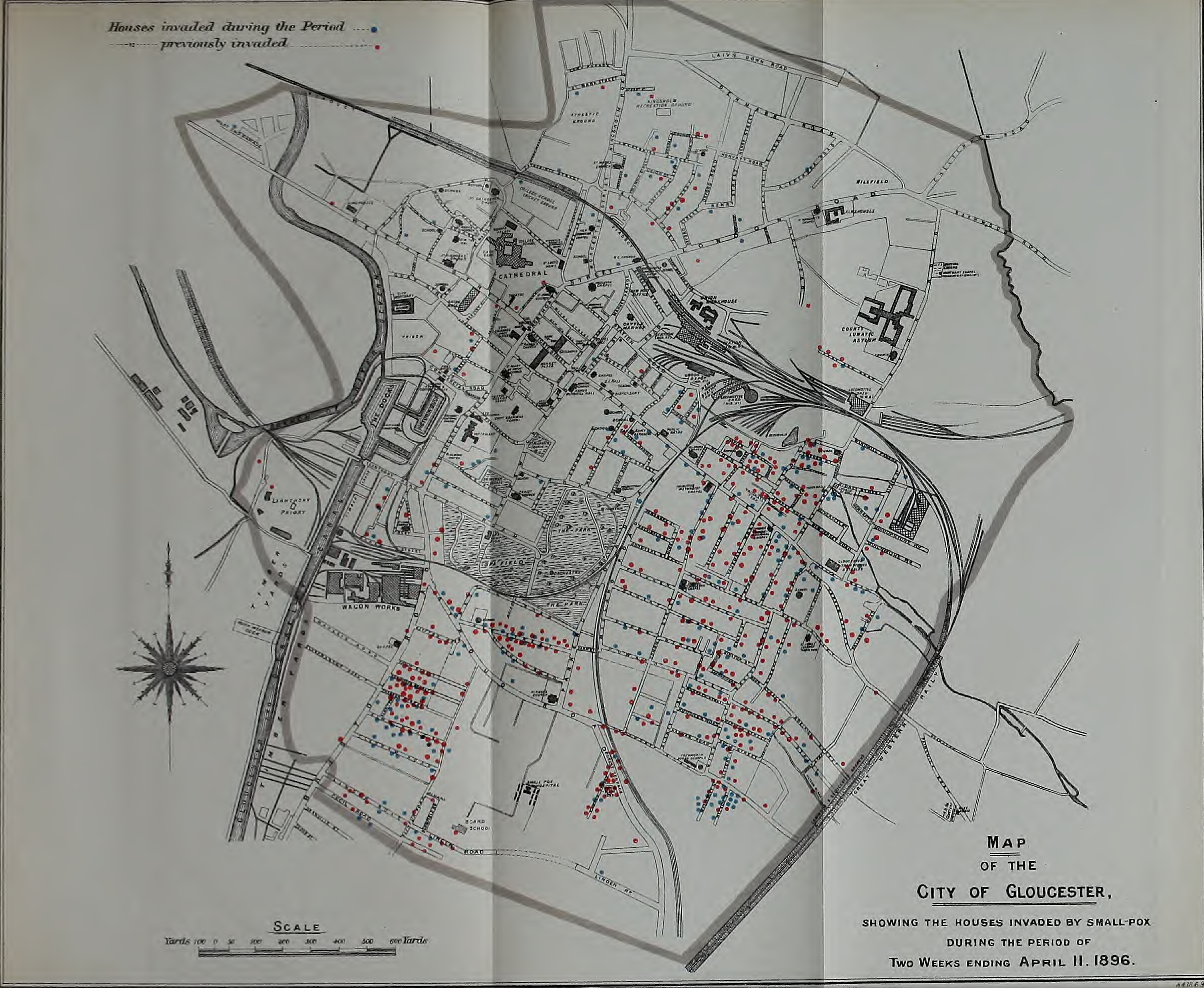
(a) *In Streets not previously invaded* (28).

Alexandra Road, 1; Arthur Street, 1; Bull Lane, 1; Cambridge Street, 1; Clarence Street, 1; Clement Street, 1; Clifton Terrace, 1; Henry Street, 1; Herbert Road, 1; London Road, 1; Mill Street, 2; Norfolk Street, 1; Northgate, 1; Park Road, 1; Parliament Street, 1; Portland Street, 1; St. Catherine Street, 2; St. Mary's Square, 1; Slaney Street, 1; Spa Road, 1; Suffolk Street, 1; Swan Lane, 1; Sweetbriar Street, 1; Old Tram Road, 2; West End Parade, 1; Windmill Parade, 1; Worcester Parade, 1; Worral Street, 1.

(b) *In Streets previously invaded* (73).

Albany Street, 1; Albert Street, 1; Alfred Street, 5; Alma Place, 12; Alma Terrace, 2; Archibald Street, 1; Baker Street, 1; Barton Street, 9; Barton Terrace, 1; King's Barton Street, 1; Blenheim Road, 1; Bristol Road, 1; Brook Street, 2; Carmarthen Street, 1; Castle Street, 3; Cecil Road, 2; Clegram Road, 5; Conduit Street, 1; Dainty Street, 1; Daventry Terrace, 1; Derby Road, 3; Ducie Street, 4; Dynevor Street, 3; Eastend Road, 1; Falkner Street, 1; Forest Terrace, 1; Guinea Street, 1; Hanman's Road, 2; High Street, 1; Hopewell Street, 5; Howard Street, 3; India Road, 4; Jersey Road, 1; Knowles Road, 2; Ladybellgate, 1; Linden Road, 6; Longsmith Street, 1; Magdala Road, 1; Melbourn Street, 3; Midland Road, 1; Milbrook Street, 4; Moor Street, 1; Morpeth Street, 1; Morton Street, 3; Napier Street, 2; Nelson Street, 7; New Street, 10; High Orchard Street, 2; Princes Street, 2; Regent Street, 4; Robin Hood Street, 5; Rycroft Street, 4; St. James' Street, 5; St. Mark Street, 1; St. Paul's Road, 2; Salisbury Road, 2; Sebert Street, 1; Seymour Road, 1; Sherbourne Street, 2; Southgate, 1; Stratton Road, 1; Stroud Road, 5; Theresa Street, 2; Tredworth Road, 4; Twyver Street, 2; Union Street, 1; Victoria Street, 6; Victory Road, 2; Wellesley Street, 7; Wellington Street, 2; Weston Road, 2; Widden Street, 1; Worcester Street, 1.

Total houses newly invaded - - - - - -	224
,, previously invaded - - - - - -	420
	644



MAP
OF THE
CITY OF GLOUCESTER,

SHOWING THE HOUSES INVADED BY SMALL-POX
DURING THE PERIOD OF
TWO WEEKS ENDING APRIL 11. 1896.

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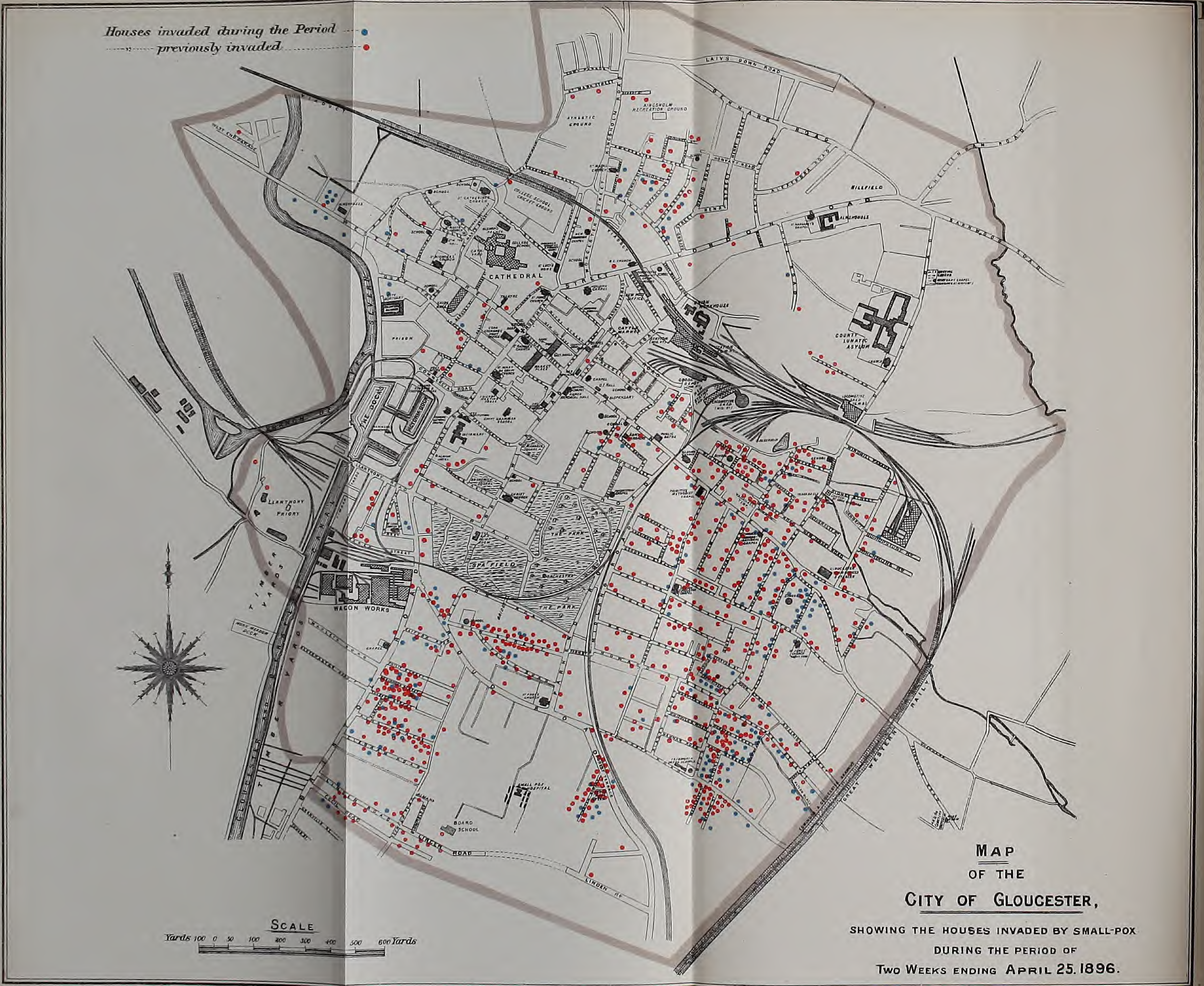


MAP
OF THE
CITY OF GLOUCESTER,

SHOWING THE HOUSES INVADED BY SMALL-POX
DURING THE PERIOD OF
TWO WEEKS ENDING APRIL 25. 1896.

MAP IX.

Houses invaded during the Fortnight ending April 25, 1896 (*see* page 56).

(a) *In Streets not previously invaded* (6).

Bishopstone Road, 1; Blackfriars, 2; Church Street, 2; Hyde Lane, 1; St. Nicholas Terrace, 1; Priory Road, 1.

(b) *In Streets previously invaded* (66).

Albany Street, 3; Alma Place, 4; Alma Terrace, 1; Alvin Street, 3; Barton Street, 11; Barton Terrace, 1; King's Barton Street, 1; Birchmore Road, 1; Bristol Road, 3; Carmarthen Street, 5; Castle Street, 7; Cecil Road, 2; Clegram Road, 2; Clement Street, 11; Clifton Road, 3; Conduit Street, 4; Ducie Street, 5; Dynevor Street, 1; Exhibition Street, 1; Forest Terrace, 1; Hanman's Road, 1; High Street, 2; Hopewell Street, 4; Howard Street, 2; India Road, 1; Jersey Road, 1; Knowles Road, 1; Linden Road, 2; Llandilo Street, 1; Longsmith Street, 1; Magdala Terrace, 1; Matson Place, 2; Melbourn Street, 10; Milbrook Street, 3; Moor Street, 2; Morpeth Street, 1; Morton Street, 5; Nelson Street, 2; New Street, 7; Paul Street, 3; Philip Street, 1; Princes Street, 1; Raglan Street, 1; Robin Hood Street, 4; Rycroft Street, 2; St. James's Street, 10; St. Mary's Square, 1; St. Paul's Road, 2; Salisbury Road, 2; Seymour Road, 1; Sherborne Street, 3; Sidney Street, 1; Stratton Road, 1; Stroud Road, 5; Suffolk Street, 1; Swan Lane, 1; Theresa Street, 1; Tredworth Road, 5; Union Street, 3; Upton Street, 1; Victoria Street, 3; Victory Road, 8; Wellesley Street, 1; Wellington Street, 1; Westgate, 11; Worcester Parade, 1.

Total houses newly invaded - - - - -	202
„ previously invaded - - - - -	644
	846

MAP X.

Houses invaded during the Fortnight ending May 9, 1896 (*see* page 60).

(a.) *In Streets not previously invaded* (6).

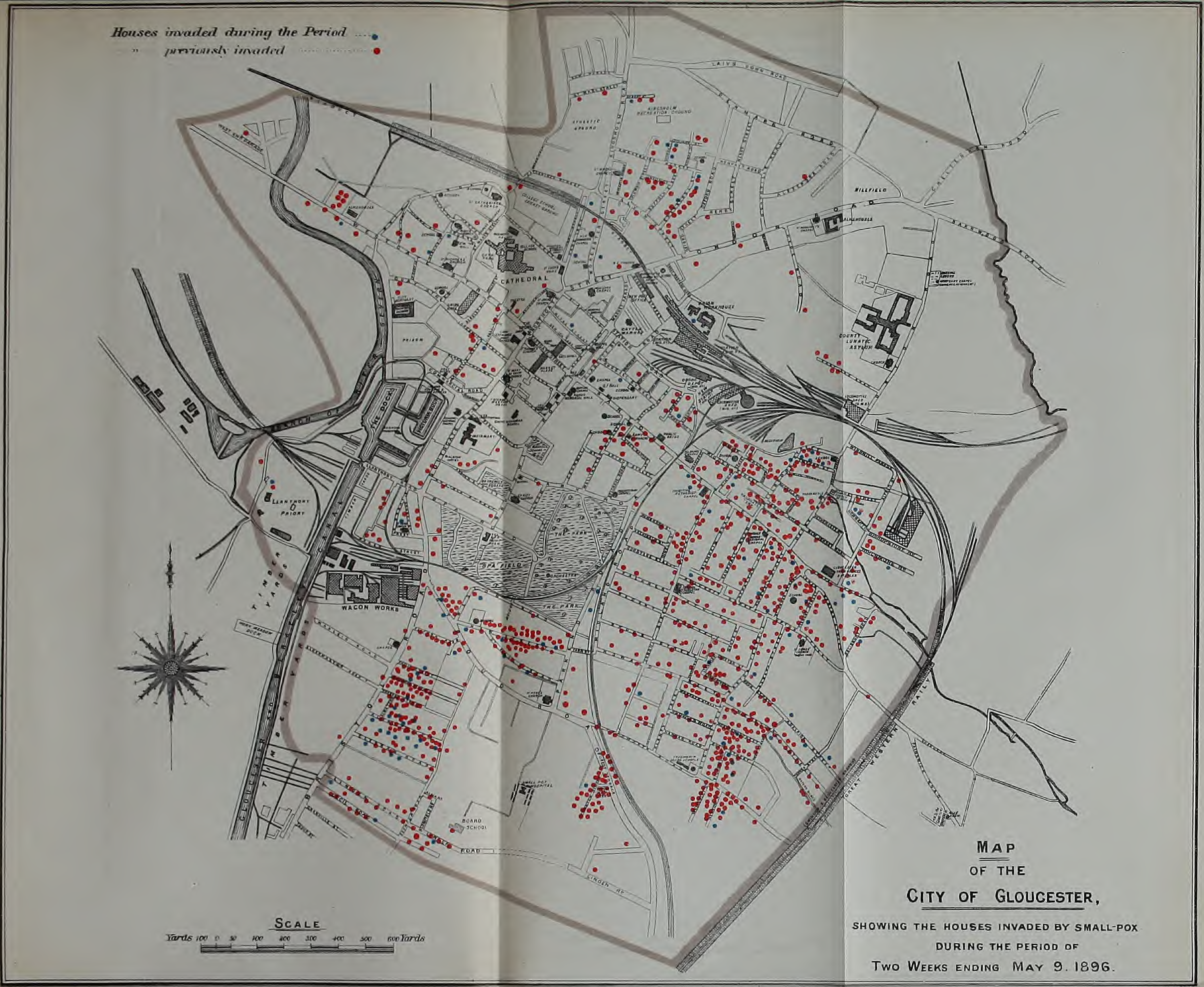
Chapel Street, 1; Deacon Street, 1; Hare Lane, 2; Mitre Street, 1; Russell Street, 1; "Union Workhouse," 1.

(b.) *In Streets previously invaded* (50).

Adelaide Street, 3; Alfred Street, 1; Alma Place, 11; Alma Terrace, 1; Barton Street, 6; Barton Terrace, 2; Birchmore Road, 1; Castle Street, 1; Cecil Road 2; Clegram Road, 4; Clement Street, 2; Clifton Terrace, 1; Ducie Street, 1; Herbert Road, 2; Hopewell Street, 1; India Road, 2; Knowles Road, 2; Linden Road, 1; Llandilo Street, 1; Llanthony Cottages, 1; Longsmith Street, 1; Melbourn Street, 1; Milbrook Street, 3; Morton Street, 1; Nelson Street, 2; New Street, 3; Parkend Road, 2; Philip Street, 2; Princes Street, 1; Robin Hood Street, 1; Rycroft Street, 2; St. James's Street, 1; St. Luke Street, 1; St. Paul's Road, 2; Salisbury Road, 1; Sebert Street, 1; Sherborne Street, 3; Sinope Street, 1; Stroud Road, 2; Theresa Street, 1; Tredworth Road, 1; Twyver Street, 2; Upton Street, 1; Vauxhall Road, 1; Victoria Street, 1; Victory Road, 3; Westgate, 2; Weston Road, 1; Worcester Street, 1; Worrall Street, 3.

Total houses newly invaded - - - - - -	101
„ previously invaded - - - - - -	846
	947

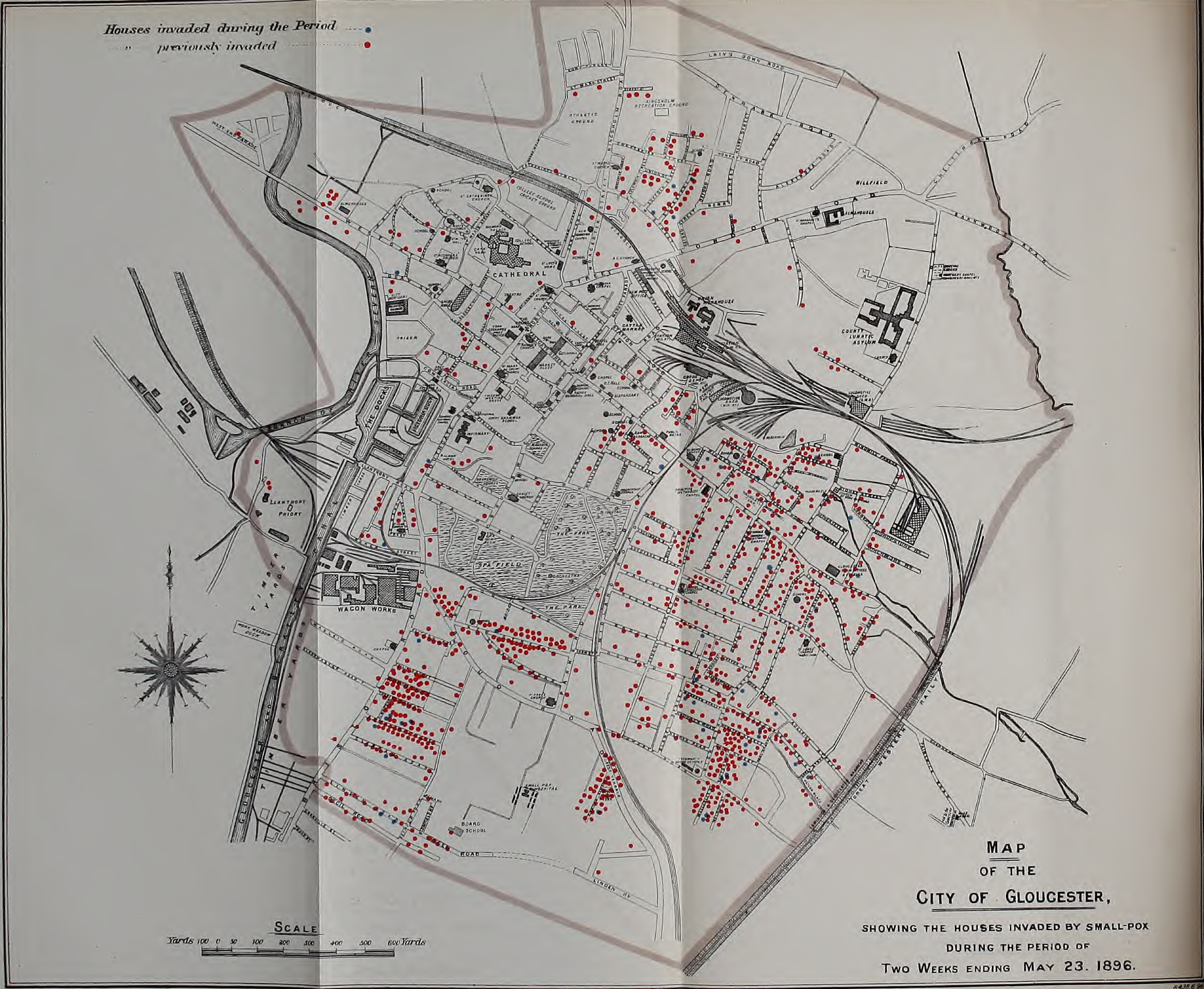
X.



MAP
OF THE
CITY OF GLOUCESTER,

SHOWING THE HOUSES INVADED BY SMALL-POX
DURING THE PERIOD OF
TWO WEEKS ENDING MAY 9. 1896.

6438 6.96.



MAP OF THE CITY OF GLOUCESTER,

SHOWING THE HOUSES INVADED BY SMALL-POX DURING THE PERIOD OF TWO WEEKS ENDING MAY 23. 1896.

8438.6.96

MAP XI.

Houses invaded during the Fortnight ending May 23, 1896 (*see* page 62).

(a.) *In Streets not previously invaded* (2).

Charles Street, 1; Quay Street, 1.

(b.) *In Streets previously invaded* (35).

Alfred Street, 1; Alma Place, 4; Alma Terrace, 1; Alvin Street, 1; Baker Street, 1; Barton Terrace, 1; Castle Street, 1; Clegram Road, 1; Clement Street, 2; Clifton Road, 1; Dainty Street, 1; Derby Road, 1; Ducie Street, 1; Herbert Road, 1; Hopewell Street, 1; Knowles Road, 1; Linden Road, 2; Melbourn Street, 3; Mitre Street, 1; Moor Street, 1; Morpeth Street, 2; Morton Street, 2; Nelson Street, 1; New Street, 1; Northgate, 1; Park Road, 1; Regent Street, 1; Sherborne Street, 2; Southgate, 1; Suffolk Street, 1; Twyver Street, 1; Victoria Street, 1; Victory Road, 2; Wellesley Street, 1; Widden Street, 2.

Total houses newly invaded - - - - - - -	49
,, previously invaded - - - - -	947
	996

MAP XII.

Houses invaded during the Fortnight ending June 6, 1896 (*see* page 64).

(a) *In Streets not previously invaded* (3).

Docks, 1; Gardiner's Row, 1; Hethersett Road, 1.

In Streets previously invaded (41).

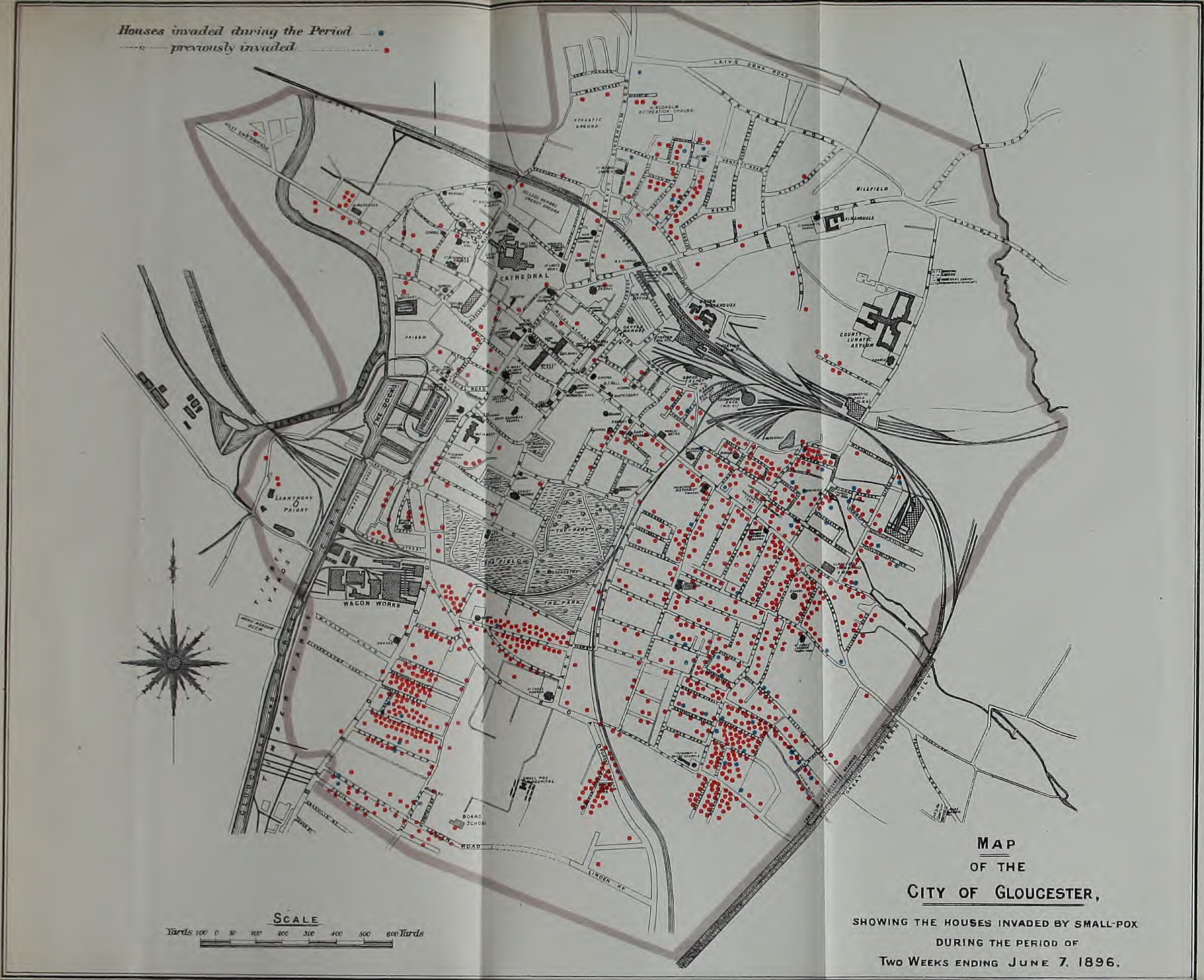
Albany Street, 1; Albert Street, 1; Alfred Street, 1; Alma Place, 3; Barton Street, 1; Birchmore Road, 2; Brook Street, 2; Carmarthen Street, 1; Cecil Road, 1; Charles Street, 1; Clegram Road, 2; Counsel Street, 1; Dainty Street, 1; Derby Road, 2; Ducie Street, 1; Dynevor Street, 1; Herbert Road, 1; High Street, 2; India Road, 1; Jersey Road, 1; Knowles Road, 2; Linden Road, 1; Magdala Road, 2; Melbourn Street, 3; Milbrook Street, 1; Moor Street, 2; Morton Street, 2; New Street, 1; Rycroft Street, 1; Seymour Road, 1; Sherborne Street, 1; Sidney Street, 1; Sinope Street, 1; Suffolk Street, 1; Sweetbriar Street, 1; Tredworth Road, 1; Twyver Street, 1; Upton Street, 1; Victoria Street, 1; Victory Road, 2; Worrall Street, 1.

Total houses newly invaded - - - - - -	58
„ previously invaded - - - - -	996
	1,054

XII.

Houses invaded during the Period ..... ●

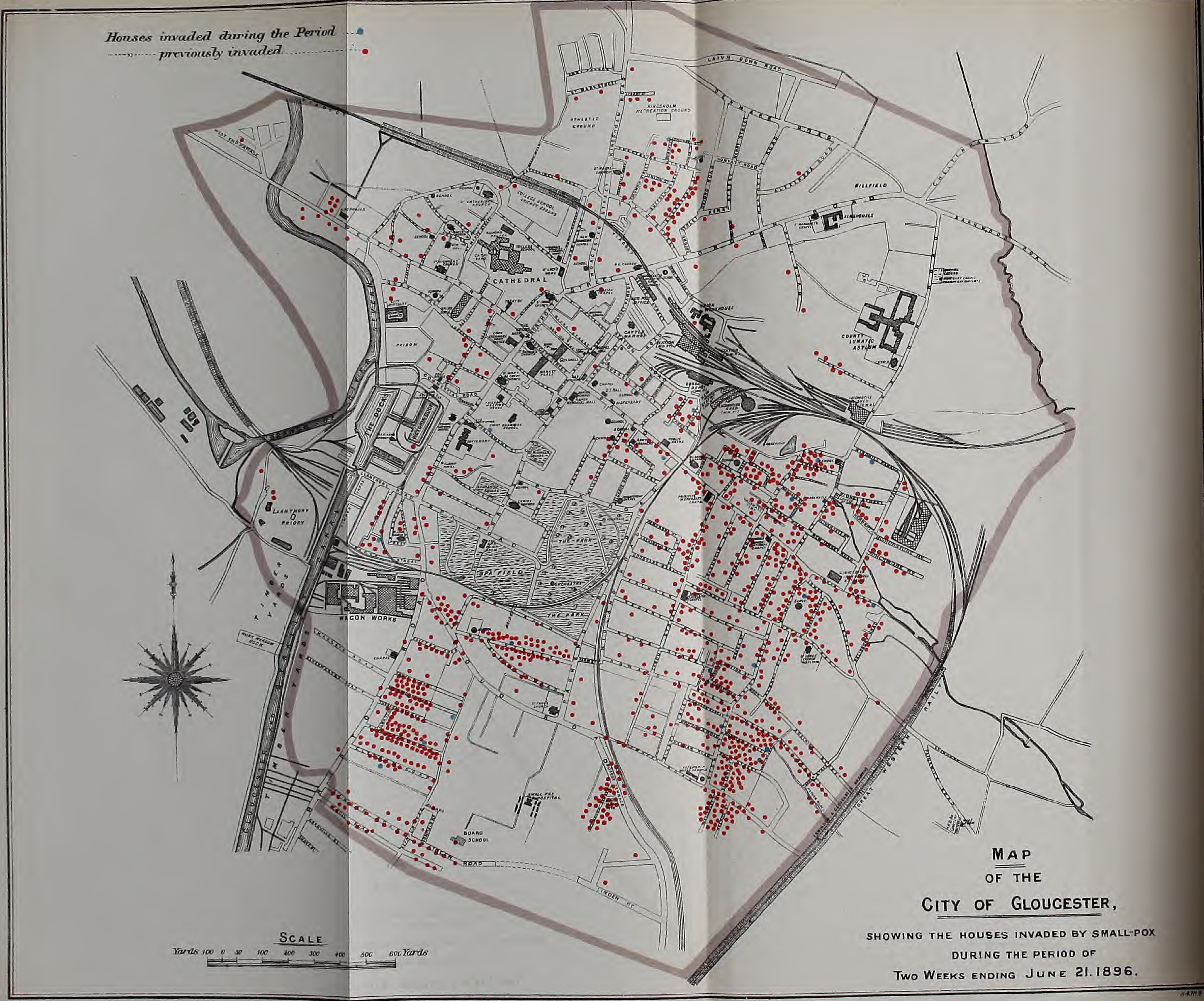
......„...... *previously invaded* .... ●



MAP
OF THE
CITY OF GLOUCESTER,

SHOWING THE HOUSES INVADED BY SMALL-POX
DURING THE PERIOD OF
TWO WEEKS ENDING JUNE 7. 1896.

8438.6.96



MAP
OF THE
CITY OF GLOUCESTER,

SHOWING THE HOUSES INVADED BY SMALL-POX
DURING THE PERIOD OF
TWO WEEKS ENDING JUNE 21. 1896.

MAP XIII.

Houses invaded during the Fortnight ending June 20, 1896 (*see* page 66).

(a.) *In Streets not previously invaded* (0).

(b.) *In Streets previously invaded* (19).

Albert Street, 1 ; Alma Place, 1 ; Barton Street, 1 ; Barton Terrace, 1 ; Clegram Road, 1 ; Clement Street, 1 ; Dainty Street, 1 ; Dynevor Street, 1 ; Exhibition Street, 1 ; High Street, 1 ; India Road, 1 ; Magdala Road, 1 ; Millbrook Street, 1 ; New Street, 1 ; Parliament Street, 1 ; Paul Street, 2 ; Seymour Road, 1 ; Windmill Parade, 1 ; Worrall Street, 1.

Total houses newly invaded - - - - -	20
„ previously invaded - - - - -	1,054
	1,074

MAP XIV.

Houses invaded during the Fortnight ending July 4, 1896 (*see* page 67).

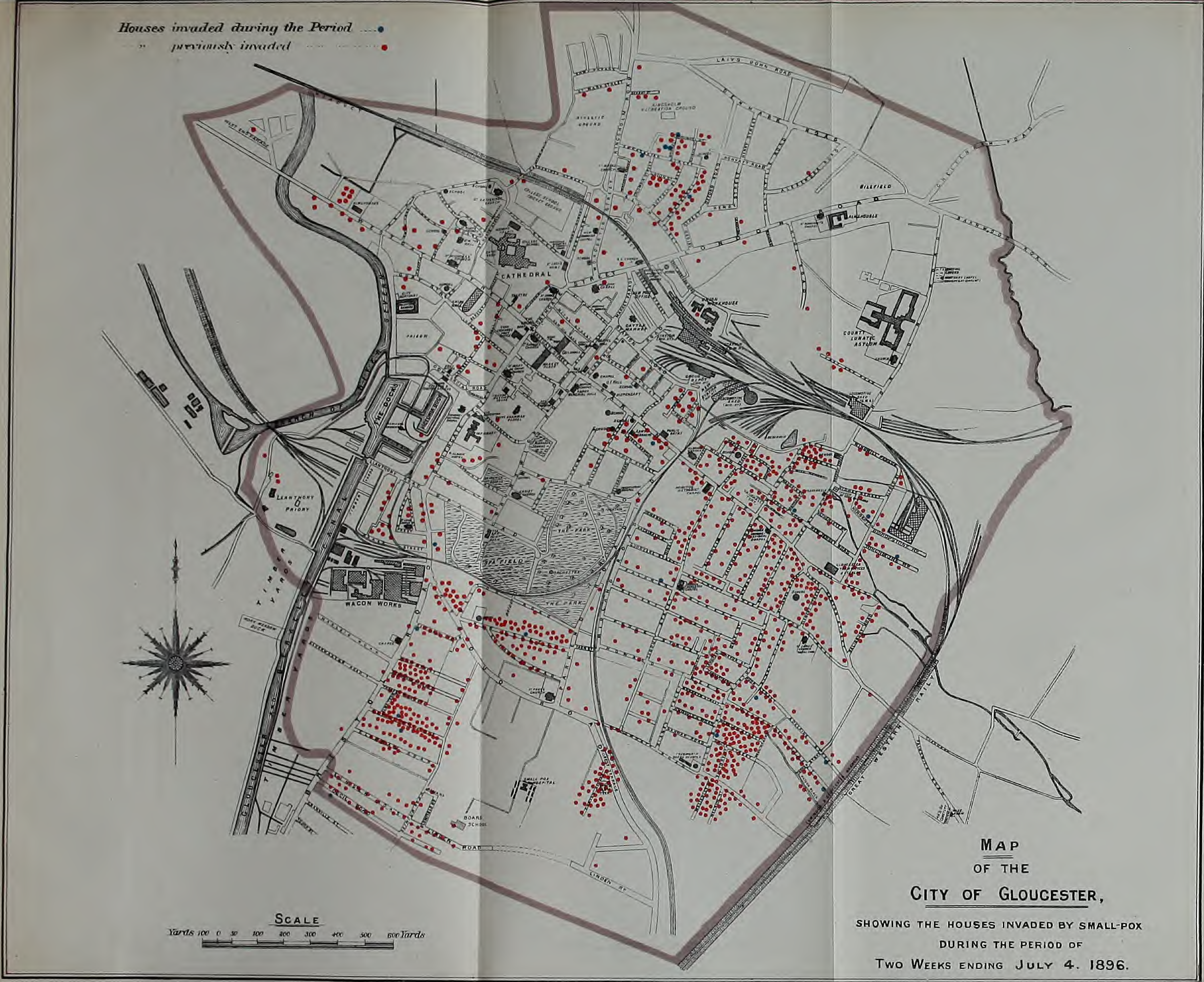
(a.) *In Streets not previously invaded* (1).

Percy Street, 1.

(b.) *In Streets previously invaded* (17).

Adelaide Street, 1 ; Alma Place, 2 ; Barton Street, 1 ; Birchmore Road, 1 ; Cecil Road, 1 ; Clifton Road, 1 ; Counsel Street, 1 ; Falkner Street, 1 ; Herbert Road, 1 ; High Street, 1 ; Magdala Terrace, 1 ; Melbourn Street, 1 ; New Street, 1 ; Sherborne Street, 1 ; Southgate, 1 ; Sweetbriar Street, 1 ; Worrall Street, 2.

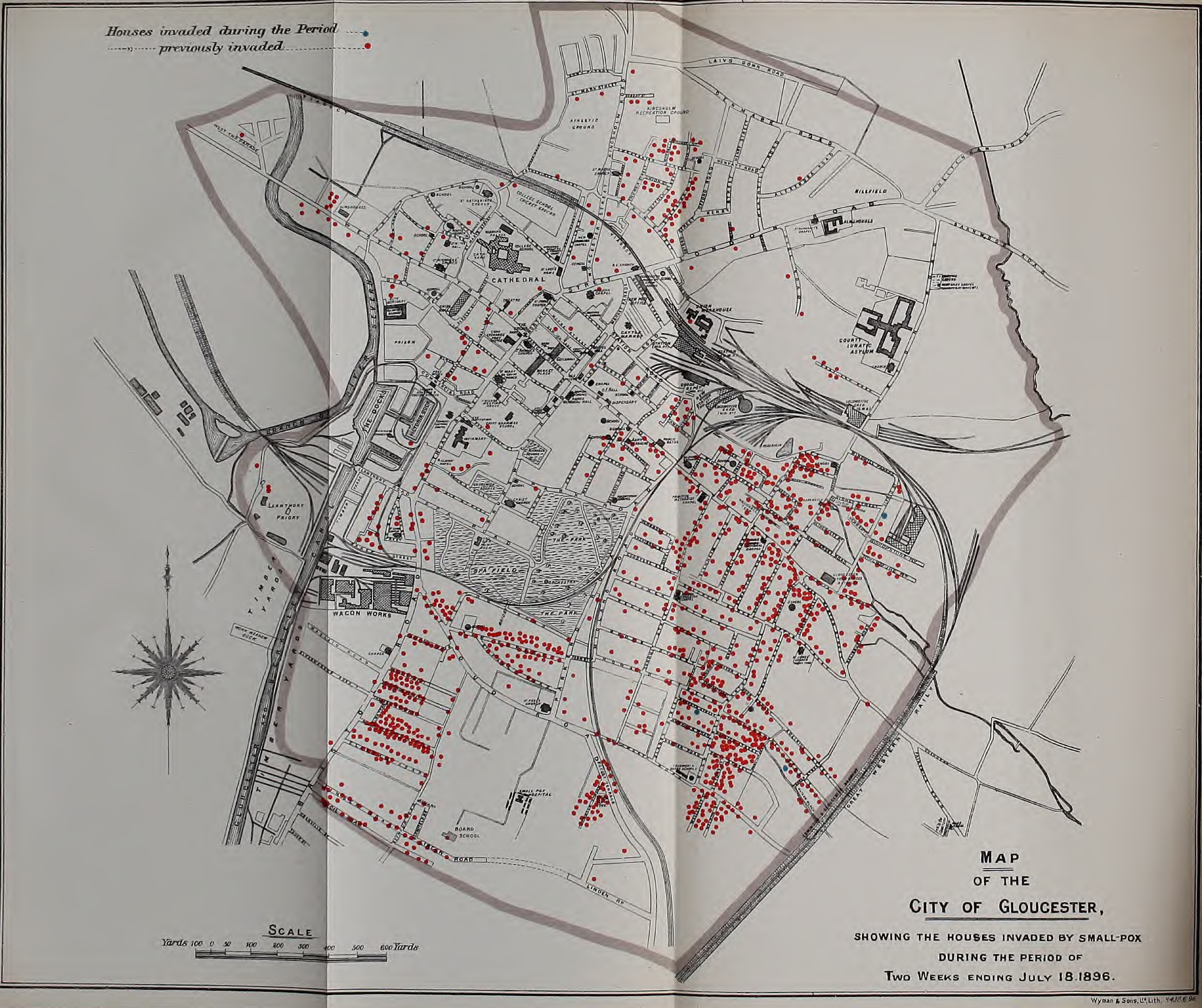
Total houses newly invaded - - - - - -	20
„ previously invaded - - - -	1,074
	1,094



MAP OF THE CITY OF GLOUCESTER,

SHOWING THE HOUSES INVADED BY SMALL-POX DURING THE PERIOD OF TWO WEEKS ENDING JULY 4. 1896.

8438.6.96



MAP OF THE CITY OF GLOUCESTER,

SHOWING THE HOUSES INVADED BY SMALL-POX DURING THE PERIOD OF TWO WEEKS ENDING JULY 18.1896.

Wyman & Sons, Ltd. Lith. 9432.6.96.

MAP XV.

Houses invaded during the Fortnight ending July 18, 1896 (*see* page 68).

(a) *In Streets not previously invaded* (0).

(b) *In Streets previously invaded* (4).

Alfred Street, 1; Melbourn Street, 1; Morpeth Street, 1; Percy Street, 1.

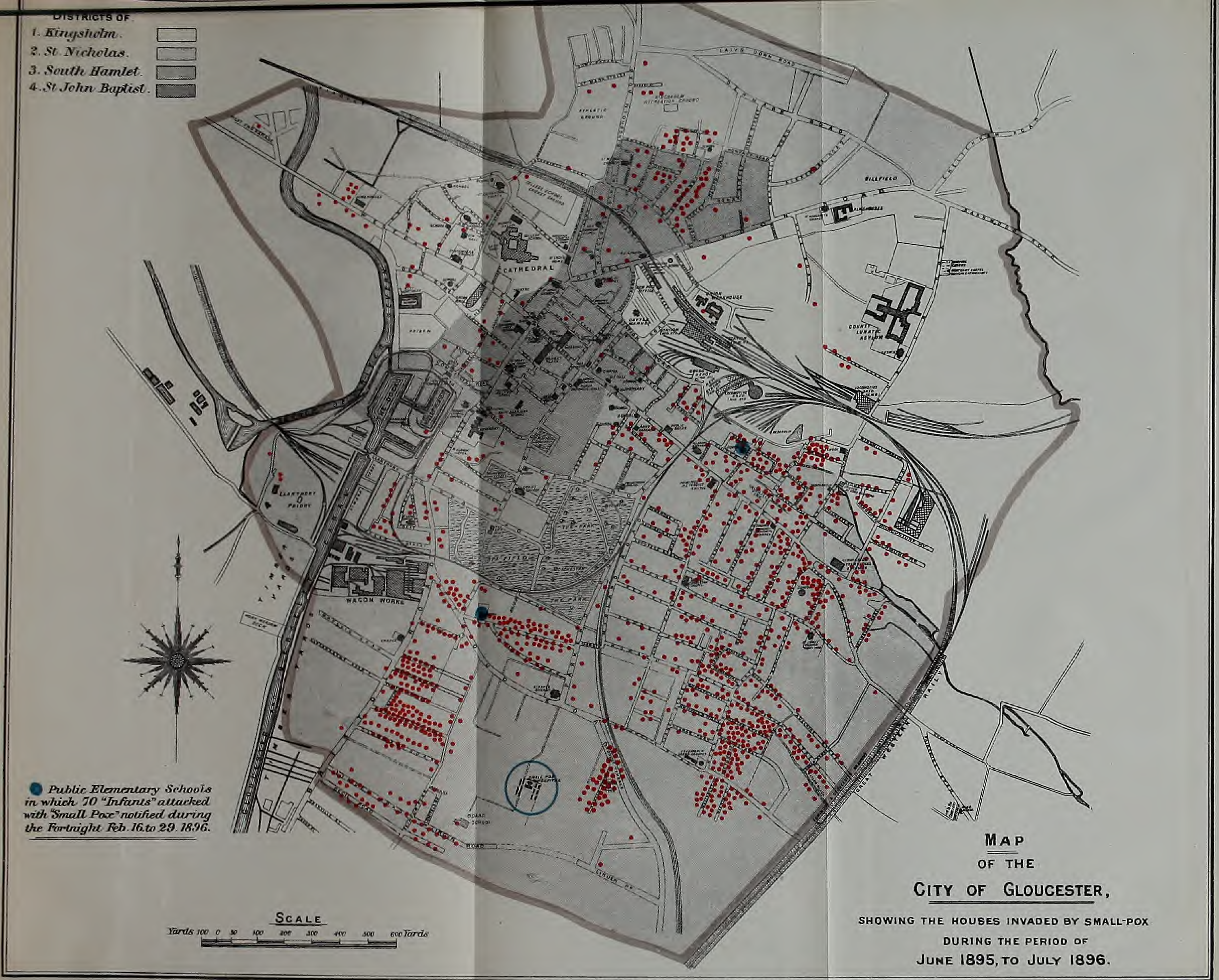
Total houses newly invaded - - - - - -	4
,, previously invaded - - -	1,094
	1,098

MAP XVI.

This map is intended to show the distribution of the houses invaded by small-pox throughout the epidemic in relation to density of population. The four districts of the city are given, their respective population density being indicated by depths of shading, the most populated being the darkest shaded, and the least densely peopled being left unshaded. These districts are (1) *Kingsholm*, with a population density of about 10 persons per acre. In this district there were 51 houses invaded by small-pox, yielding 90 cases. (2) *St. Nicholas*, with a population density of about 21 persons per acre. In this district there were 45 houses invaded, yielding 64 cases of small-pox. (3) *South Hamlet*, having a population density of about 31 persons per acre. In this district there were 933 houses invaded, yielding 1,715 cases of small-pox. (4) *St. John Baptist*, the oldest part of the city, having a population density of about 64 persons per acre. In this district there were 69 houses invaded, yielding 110 cases of small-pox.

In this map are also specially indicated the sites of the Widden Street and St. Luke's (New Street) Schools, where many children were infected by small-pox in the fortnight ending February 29, 1896.

XVI.



MAP
OF THE
CITY OF GLOUCESTER,
SHOWING THE HOUSES INVADED BY SMALL-POX
DURING THE PERIOD OF
JUNE 1895, TO JULY 1896.

1098 houses, 1979 cases.

Wyman & Sons Ltd, Lith. 8438.6.96.